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No. 6

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On Monday the council of the United States Chamber of Commerce met preliminary to the annual meeting of the Chamber which took place on Tuesday, Wednesday and Thursday. A resolution was introduced in the council which was referred to the Committee on Resolutions to be put in final shape for submission to the Chamber. This resolution in substance was that whereas there was imminent danger of a disagreement between railroad managers and railroad employees, and that a strike or lockout of railroad employees would be a calamity not only to the shippers, but to the public, that a committee of the Chamber of Commerce of the United States be appointed to make an impartial investigation as soon as possible and to report to the Chamber from time to time their findings. Action by the Chamber along these lines is of nation wide interest and importance. The railroad brotherhoods announced that they might not arbitrate their demand for an eight-hour day (an increase of wages). Whether or not, however, they consent to an arbitration, an impartial investigation, such as that proposed for the Chamber of Commerce would be of inestimable value to the public first of all, and also both to the rank and file of railroad employees and to railroad managers. The work of the Board of Mediation and Conciliation, when it is called upon in labor disputes, consists of attempting to get the parties together on some basis of "out of court" agreement. When the matter goes to arbitration both sides to the controversy resort to special pleading in an attempt to get as much as is possible. The decision of the arbitrators has always been a compromise, and while arbitrations have almost universally resulted in granting some of the demands of labor, so that labor has something to gain, and gains it in each case, and nothing to lose, the actual facts have never been clearly and impartially laid before the court of public opinion. Since the public has the greatest interest in the uninterrupted working of the railroads, it has a right to a presentation of the facts in disputes which is colored neither by the desires of the employees, nor by the duties which the railroad managers owe to their stockholders; nor by the efforts of a board of arbitration to arrive at a practical compromise in a specific instance. An investigation by a committee of the Chamber of Commerce would meet this requirement admirably.

The publicity bureau of the engineers' and firemen's brotherhoods at Washington, D. C., has sent out a statement to show that the employees of the boot and shoe industry are "aristocrats of labor" as compared with engineers and firemen. The statement says, that whereas engineers and firemen work more than 10 hours a day, less than five per cent of the boot and shoe workers "undergo similar strain" and that while the hours in the boot and shoe industry have been reduced three per cent since 1910, and the wage rate has been increased 12 per cent, the engineers and firemen "have been compelled to operate larger locomotives and heavier trains without material changes in hours or wages." According to the statistics of the Interstate Commerce Commission the average daily compensation of the locomotive engineers on the railways of the United States increased 15 per cent from 1910 to 1914, while that of the firemen increased 17 per cent, without mentioning the additional increases the western engineers and firemen received in 1915. Granting that the figures regarding the reduction in hours in the shoe industry are correct the enginemen still have the best of it. While the engineers and firemen may work more hours *per day* they work less hours *per week* than the men in the shoe industry, while their earnings both per hour and per week are very much greater. The hours on duty and the earnings, in the two classes of work, according to statistics of enginemen's wages on the Western railroads introduced in the arbitration proceedings last year, and of employees in the shoe industry shown in Bulletin No. 154 of the Bureau of Labor Statistics, both for the year 1913, compare as follows:

	Shoe Industry	Engineers	Firemen
Total average hours on duty, per week.....	55.2	56.1	55.7
Average earnings per hour on duty.....	.3487	.65	.42
Average earnings per week.....	\$19.17	36.47	23.39

The boot and shoe employees will have to do better than that before they can qualify as "aristocrats of labor." There are some classes of railway employees who might look with envy upon the wages and hours in the shoe industry, but the enginemen and firemen are not among them. If the demands now being voted on by the enginemen and trainmen should be granted by the railways their hours of service would not

be appreciably affected, while a 25 per cent increase in their rate of pay would make their average earnings per hour about twice those in the shoe business.

The New York State Public Service Commission denies the application of citizens of Cortland for an order requiring an

**The Demand for
Cheap Passenger
Service**

additional passenger train over the Lehigh Valley Railroad to Auburn (43 miles, over two divisions) because the road has shown the present passenger service to be unprofitable; but at the same time tells the road that "the familiar local passenger train (of an engine and three or four cars) is in a state of obsolescence"; and gasoline cars are cautiously recommended. "If the solution does not lie in gasoline, it must be found elsewhere"; and the railroads are held to be unenterprising for not having developed something better than their present facilities. This is good advice, no doubt, speaking generally; but the commission's report has too much of the tone of a Clifford Thorne decision. It says that interurban roads have run gasoline cars at a cost of 29 cents a mile; but whether the men who operate them are competent to run on a high-speed line like the Lehigh Valley, or would have to be supplanted by a higher priced crew, is not stated. The high pay of trainmen is a chief obstacle to cheap passenger service. Again, interurban cars make a good share of their revenue by running in or near highways and stopping for passengers anywhere and everywhere; the steam roads whose passenger trains are not profitable, have lines which have been located and built for cheap freight transportation and cannot get this wayside passenger business on any terms. Most steam roads are quick to see any chance to increase the volume of their passenger service, and many are using gasoline cars; but the demand for more frequent trains, which is constantly pressing in a hundred places, cannot always be met by the mere device of putting on trains whose cost per train mile will be less than the average. When a state commission puts forth an incomplete study of a case of this kind it feeds the people on hopes of a shadowy kind—not to say wholly false.

In refusing to postpone action on the application of the Long Island for authority to issue \$13,000,000 debenture bonds, the New York Public Service Commission, Second district, has made it plain that it would not tolerate an attempt to use the commission to "hold up" a railroad company as part of a campaign against the management by minority stock interests. Dick Brothers, a brokerage firm of New York and Boston, have a suit pending for an accounting by the directors of the Long Island for all moneys spent for improvements since 1901. This suit, as previously noted in the *Railway Age Gazette*, was brought after the Pennsylvania, which owns the majority of the stock of the Long Island, had refused to take over a block of the minority stock from Dick Brothers at the price which the stock brokers asked for it. The New York Public Service Commission was appealed to by Dick Brothers to withhold its approval of an issue of \$13,000,000 debentures to be used to reimburse the Pennsylvania Railroad for advances made for improvements and additions to the Long Island until the pending suit had been passed upon by the Supreme Court. The commission points out that if there had been any legal reason why its approval should have been withheld it would have been a simple matter for Dick Brothers to have procured a restraining order from the court. Their failure to do so apparently convinced the commission of their lack of justification for their action. This would be the most likely interpretation of a disinterested outsider. Incidentally it is interesting to note that the

commission refutes conclusively the insinuations which have been made by certain newspapers in regard to the relations between the Pennsylvania and the Long Island. The examination went back to 1907 and was one of the most complete ever made by this commission of a railroad property. While it is announced that certain minor changes in accounting were recommended by the commission and accepted by the road, the commission found that the expenditures for improvements were properly chargeable to capital account and that the amount spent on these improvements was advanced by the Pennsylvania to the Long Island. The weight which the commission's findings carry and the publicity which it is able to give to these findings is an instance of beneficent state regulation.

WILL THERE BE A STRIKE?

IT is difficult to decide, from the statements attributed to the leaders of the train service brotherhoods, to what extremity they are disposed to go in attempting to enforce their demands for a \$100,000,000 a year increase in wages. They repeatedly have been quoted as saying that their organizations would not submit their demands to arbitration. For example, on January 24, Timothy Shea, vice-president of the Brotherhood of Locomotive Firemen and Enginemen, was quoted as having said in an interview: "I don't think there will be any arbitration this time. I think all the arguments will follow the strike order and not precede and delay it. . . . If our demands are not acceded to the men will walk out."

It has been assumed that by such explicit statements the brotherhood leaders have meant that the only alternative to the granting of their demands is a strike. This week, however, the newspapers have published a despatch from Cleveland quoting Warren S. Stone and W. G. Lee as saying that the prospective great strike is merely a "pipe dream." The brotherhood leaders, apparently, are having some difficulty in their effort to carry water on both shoulders—to give out the impression that they are irresistibly determined to get what they are after, and at the same time to avoid being placed in an attitude of threatening to demoralize the business of the country for the purpose of furthering their own ends.

The public should, however, look the facts squarely in the face. The demands will in due course be presented to the railways. It is not conceivable that the railway managers will accede to them unless as the result of the award of an arbitration board. In fact, they could not do so without being derelict in their duty to their stockholders and the public. The particular demands being made involve, as already indicated, about \$100,000,000 a year, or an increase in the wages now being paid to the engineers, firemen, conductors and trainmen of approximately 25 per cent. These employees, however, are already paid higher wages than other railway employees. While constituting only 18 per cent of the total number of employees they receive 28 per cent of the total wages paid. If, therefore, the railways, without arbitration, should grant them an increase of 25 per cent, how could they consistently refuse a proportionate increase to the remaining million and a half of their employees who are not so well paid? But such an increase to all employees would cost over \$330,000,000 a year. This would be equal to 73 per cent of the largest amount of railway dividends ever declared.

It would be impossible for the railways to meet such enormous increases in wages without ruin to their stockholders, unless they were offset by increases in rates. But how can it be assumed, without previous arbitration, that they would be offset by advances in rates? If the railway managers should go ahead and grant them without the question having first been submitted to somebody representing the public, the

public might take the position subsequently that the railway managers had taken this step on their own responsibility; that the conditions existing in industrial and commercial affairs did not warrant the increases in passenger and freight rates necessary to pay the bill, and that, therefore, these increases in rates should not be granted. If any great additional burden is to be imposed, the party, whether the stockholders or the public, which is to bear the burden has a right, before it is imposed, to have settled by some impartial body the question whether or not it ought to be imposed.

Since it is certain that the railway managers will not grant the demands, unless practically forced to by an arbitration award, and since the labor leaders say they will not arbitrate, there remain only two alternatives: for the labor leaders to back down or for them to call a strike.

There is no question that if the brotherhoods included in this movement could get all their members to go out the strike would tie up our entire system of railways. The effects which would be produced on the railways, on industry and commerce, and on every class of the public it is impossible now even to imagine. We shall never be able to conceive of them until we have experienced the reality. Modern civilization, its industry, its commerce, its society, even its political organization, have grown up around and are predicated on the continuous rendering of railway service; and an interruption of that service throughout the whole country lasting for any considerable period would cause incalculable losses and suffering to all.

Why are we being threatened with this calamity? Is it because these employees are badly treated and poorly paid? On the contrary, they are the best paid and most favorably situated employees of the railways, and are among the best paid and most favorably situated workingmen in America. Is it because there is no means provided for settling such controversies without resort to a lockout or a strike? On the contrary, the Congress of the United States has provided in the Newlands law, the enactment of which these very labor organizations favored, a measure expressly intended to afford a means for the peaceful settlement of disputes between them and the railways. Is it because arbitrations under this law have uniformly gone against labor? On the contrary, there has never been an arbitration under the law in which labor has not gained increases in wages. Then why do the leaders of labor say they will not arbitrate? Merely because in past arbitrations they have not got all they have demanded. But are they the best judges as to whether the awards that have been made give them all to which they are entitled? In the other affairs of life it is not ordinarily considered that one of the parties to a controversy is the very best judge as to the fairness of the settlement made.

The demands being made by the train service employees may, or may not be justifiable. That is one question, and it is a question for the determination of which a means has been provided by law. The attitude the labor leaders are assuming regarding arbitration is absolutely unjustifiable. It is a bold attempt to strike fear into the hearts of the railway managements and the public. It is an imitation of the policy of "terror" which has been attributed to one of the great nations of Europe without greatly increasing its popularity. A strike of such proportions as that threatened would be a terrible calamity, especially under the conditions now existing in our domestic affairs and in our international relations. But it would be a great deal better for the railways and the nations to let it come than to let any combination of men, however large, terrorize them into granting what the leaders of that combination admit, by their attitude, they do not think they could get if they submitted their case to a tribunal representing the public.

COMFORTING DELAYED PASSENGERS

THIS is the title of an editorial that was printed in these columns December 24, last, in which was discussed the duty of train despatchers and station agents to at all times do their very best to inform passengers of every train delay that might necessitate a change of route, and in every practicable way to assist patrons in their efforts to cure the difficulties caused by delays. In referring to what agents and despatchers ought to do in different emergencies, it was assumed that every station would be in constant communication with division headquarters by telephone; but that editorial was hardly off the press before a letter was received from a "commuter" complaining of the annoyances suffered by passengers on the line of the New Haven road, between New York City and Port Chester, on the occasion of the disastrous storm of December 13, when telephone wires in all directions were broken down by sleet. Without telephones, and other facilities, the problem of giving satisfactory service is much more difficult. This problem comes only rarely, but its very rarity is one reason why it is difficult.

The public has no right to expect impossibilities; but a chief part of the railroadman's task is to impart that truth to passengers without increasing their irritation. In a severe emergency, like that reported from Manitoba recently, where a train was stuck in snowdrifts two days,* trainmen rise to the occasion; they have time to do a little thinking, to confer with one another and to make common cause with the passengers. They do everything that reasonably can be done, and they quiet passengers' minds in regard to hardships which must be borne. How can trainmen (and station men) successfully cultivate habits of mind which shall make them equally efficient in those smaller emergencies, which occur so much more frequently?

The trouble is in that last word—frequency. Those passengers' troubles which test the courtesy, resourcefulness or patience of the ticket seller or the trainman come far more frequently than do six-foot snowdrifts, but far less frequently than is needful to give him facility in meeting the test. He has got to learn his art in some way other than by experience. It may be said that on American railroads, generally, this teaching is neglected, especially as regards the station service. One of the best places in which to learn how to treat the public properly is the city ticket office; but how many agents at ordinary stations have had a chance to take that training course? The chief qualifications of an agent are a trustworthy moral character, experience in freight office work, acquaintance with train operation and ability to select and supervise his assistants—not to mention all of the chief qualities—and politeness (under adverse conditions) comes last. Too often it is last and least. Why is this? Is the fact that much time and money would be required to thus polish a score or a hundred agents a sufficient excuse for not trying any polishing process?

Why not try the experiment of making politeness a prime requisite, instead of a mere "frill"? One of the complaints of our "commuter" was that the agent at a small station had no telephone connection on the fifth day after the storm. From what can be learned about the troubles of the telephone companies, as well as those of the railroad, the restoration of

*After having spent sixty hours in a snowdrift higher than the engine, with a bump in the rear from another train which had telescoped the rear sleeping car to a length of four seats, the passengers who left Regina on the Canadian Northern express on Tuesday morning arrived in Winnipeg Saturday morning. The train was caught in the immense drifts 10 miles east of Brandon, and, although a flagman went back a mile, the following engine-man could not see him and passed him in the snow, much to his horror. When the train hit the Pullman the engine crushed the rear coach and came within four inches of Mrs. Fenton and her children. It also broke the steam pipes and left both trains without heat from the locomotives. The women and children were housed in the dining car, which was kept fairly warm, while the men passengers had to keep walking up and down the aisles with their heavy coats on to keep warm. There were 13 children, all under 10 years old, on the trains. Luckily the food provisions held out until the passengers were dug out by a snowplow and brought to Winnipeg. All the passengers declare that the train crew did wonders to make the passengers as comfortable as possible under the trying circumstances.—*Manitoba Free Press*, January 31.

some telephones would have been quite creditable if accomplished in seven days, or even ten; but would not the cultivation of politeness be the best means of making agents at small stations more efficient in restoring telephones—or in curing any other such unusual defect or deficiency? Politeness, as here considered, is generally paraphrased as a desire to please; and a very strong desire to please his patrons ought to be one of the best stimuli to make an agent thoughtful and energetic in correcting things that are wrong. Agents who have risked a fifty-dollar expenditure (or a larger one) for which they had no authority have, on occasion, been praised as men of good judgment, doing the right thing at the right time; how can ordinary agents be inspired with that brand of genius? How better than to put a premium—a definite premium—on the habitual desire to please?

Another complaint was that a conductor did not realize that his train load of passengers, imprisoned all night, could have been relieved, much better than he did relieve them, by making a way for them to reach a certain hotel. We are not passing on his case; it may have been only an error of judgment; but if one were to try to select the conductor who would best acquit himself in such a situation, what better could be done than to take the one who had been best trained in "the desire to please"? That desire, if enthusiastic enough, would

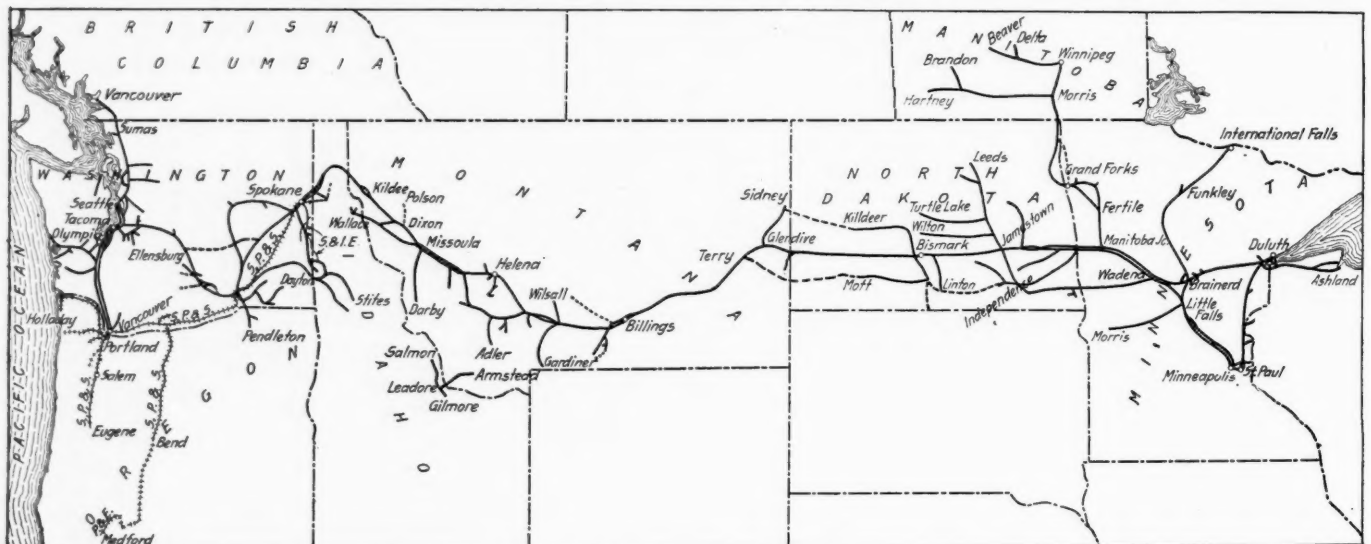
NORTHERN PACIFIC

LOOKING back, seven months after the close of the 1915 fiscal year, at the difficulties which railroad managers had to contend with, the present favorable traffic conditions form a striking contrast. After this length of time it is possible to pick out, with a fair degree of probability of being right, certain factors which were the result of the necessity for stringent economy in railroad operation which will work for the future advantage of the roads, and to pick out certain other factors resulting from the same cause which will have to be offset by subtracting from the earnings of the present large traffic.

In the fiscal year ended June 30, 1915, the total operating revenues of the Northern Pacific decreased as compared with the previous year by 10.33 per cent. Transportation expenses—the out of pocket cost of moving the business—decreased 12.77 per cent. This is one of the factors which make for the permanent gain of the company.

The Northern Pacific operates 6,466 miles of railroad. Of this about 2,882 miles can be classed as main line and 3,584 miles as branch lines. There is in addition to the main and the branch lines 699 miles of second, or second and third track.

Total operating revenues amounted to \$63,172,000, compar-



The Northern Pacific

lead him to consult more carefully with passengers—assuming that some of the passengers were men of resource; or to take a wider range in casting about for a means of escape; or to be more reckless in incurring expense. Recklessness, of course, is not recognized in the A. R. A. code; but is it not an element to be taken into account, sometimes?

One of the most potent means for spurring men to qualify for difficult tasks is a system of premiums, such as is used in perfecting tracks. Unfortunately that will not work in the field now under consideration, as there is no way to make comparative inspection of the things done. But every superintendent has a percentage of agents, clerks, conductors and trainmen who are already at or near the head of the class; and there is nothing to hinder him from doing almost anything he pleases in the way of making these men's ways and means thoroughly well known to all their fellow workers. One agent on the New Haven road is said to have "made himself solid" with all the passengers who spent the night at his station by being very free with good coffee. A conductor who sees that first quality sandwiches are in good supply at reasonable prices, may thereby make himself the most popular man on the division. Are not incidents like this worth publishing?

ing with \$67,334,000 in 1914.* Despite the fact that the Panama Exposition was being held at San Francisco during the 1915 year, the falling off in passenger revenue was even greater than in freight. Total passenger revenue amounted to \$13,619,000 in 1915, a decrease of \$2,088,000, or 13.29 per cent, as compared with the previous year. Freight revenue amounted to \$43,834,000 in 1915, a decrease as compared with the previous year of 8.98 per cent. The number of passengers carried one mile in 1915 was 600,273,000, a decrease of 12.02 per cent. The mileage run by passenger trains was 10,357,000, a decrease of 13.80 per cent.

This showing is quite unusual. It is very seldom that a railroad can take off passenger trains to such an extent as to offset a large falling off in passenger mileage by a commensurate decrease in passenger-train mileage. Economies of operation in freight service were as good or better than in passenger service but not so unusual. The revenue ton mileage amounted to 5,164,571,000 in 1915, a decrease as com-

* The comparisons are between the figures shown in the 1914 annual report and those in the 1915 annual report. The rules for making up the income account prescribed by the Interstate Commerce Commission have been changed since 1914, and in some cases the figures for 1915 do not correspond exactly with those given for 1914. The Northern Pacific did not recast its 1914 figures to correspond with the new classification. The comparison, however, is near enough not to be misleading.

pared with the previous year of 8.26 per cent. The revenue freight-train mileage was 8,108,000, a decrease as compared with the previous year of 11.77 per cent. The revenue train-load was 573 tons in 1915 as against 567 tons in 1914. The mileage of locomotives employed in helping passenger trains was 434,000 in 1915, a decrease as compared with the previous year of 27.04 per cent. The mileage of helping locomotives in freight service was 806,000, a decrease of 19.25 per cent.

There were considerable reductions made in expenditures for maintenance, and while, as will be pointed out, some of these reductions were the result of economies which are not in the nature of deferred maintenance, others probably represent sums which will have to be spent some time in the future.

Maintenance of equipment cost \$7,317,000, or 13.29 per cent less than in 1914, and the 1914 figure was a decrease as compared with 1913 of 5.50 per cent. The condition of locomotives was better at the end of the year than at the beginning. Of all the locomotives in service at the end of the year 80.46 per cent were in good condition, 11.60 in fair condition and 7.94 per cent at shops. Out of 1,361 locomotives assigned to service on the Northern Pacific, 261 are equipped with superheaters. At the end of the year the company had in service 48,160 freight cars, a decrease during the year of 814 cars. No additional passenger or freight equipment was under contract for construction on June 30, 1915. Included in the figures for maintenance of equipment are \$208,000 for depreciation of locomotives, \$398,000 for depreciation of freight cars and \$90,000 for depreciation of passenger cars. These are small charges to expenses for depreciation, and under the present rules of the Interstate Commerce Commission the railroad companies are compelled to charge a rate of depreciation which they can defend as being adequate to take care of retirements as they occur. The Northern Pacific had up to June 30, 1915, a total credit to depreciation of equipment of \$14,114,000. This is a pretty generous sum when it is remembered that the total cost of equipment as shown on the company's balance sheet is \$60,409,000. The management may well have felt that during the year 1915 it could charge a low depreciation rate and could continue so to do until retirement began to reduce the total credit to depreciation.

In 1915 the company spent \$8,524,000 for maintenance of way. This compares with \$9,364,000 spent in 1914 and \$10,188,000 spent in 1913. The 1915 expenditure was at the rate of \$1,319 per mile. While this is somewhat lower than the average spent by the Northern Pacific per mile per year since 1905, it is a fairly liberal rate to spend for a road in the Northern Pacific's territory and with the physical characteristics of that property. Special mention is made in the annual report of the fact that the total number of treated ties now in track is about 7,400,000, and that while the first cost of the treated tie is higher than that of the untreated tie, annual renewal requirements are less, and this fact made itself appreciably felt in 1915.

The total amount spent on addition investment in property was \$11,362,000. The largest items of expenditure were on the new line from Tacoma, Wash., to Tenino, \$2,287,000; the construction of the Spring Creek line in North Dakota, \$593,000; grade revision and double tracking on the Cascade mountains, \$665,000, and grade separation at Spokane, Wash., \$454,000. There was \$1,182,000 spent for new steel passenger-train cars.

The company sold during the year \$20,000,000 refunding and improvement $4\frac{1}{2}$ per cent bonds, the discount and expenses of the sale being \$1,024,000. From the proceeds of the sale \$9,605,000 was used to pay off loans and bills payable, and the company had on hand at the end of the year \$8,140,000 cash, with no loans and bills payable, and total current liabilities of but \$12,190,000.

The following table shows the principal figures for operation in 1915 as compared with 1914:

	1915.	1914.*
Average mileage operated.....	6,461	6,325
Freight revenue	\$43,833,637	\$48,058,812
Passenger revenue	13,619,114	15,707,000
Total operating revenues.....	63,171,653	68,544,802
Maintenance of way and structures.....	8,523,657	9,363,824
Maintenance of equipment.....	7,317,074	8,438,276
Traffic expenses	1,191,567	1,270,581
Transportation expenses	18,987,056	21,767,201
Miscellaneous expenses	939,338	1,132,196
General expenses	1,104,712	1,110,080
Transportation for investment—Cr.....	955,355	.....
Total operating expenses.....	37,108,049	43,082,458
Taxes	4,470,959	5,030,584
Operating income	21,588,494	22,346,985
Gross income	32,031,453	27,986,658
Net income	18,822,820	10,626,658
Dividends	17,360,000	17,360,000
Surplus	1,462,820	2,295,247

* These figures, except the expense accounts, are taken from the 1914 annual report. See note on a previous page.

UNION PACIFIC

THE Union Pacific has been in particularly good shape to handle the heavy business of the last six months of 1915, partly because of the fact that the company had to make practically no reduction in maintenance expenses in the fiscal year ended June 30, 1914. The Union Pacific was one of the few roads on which the increased tonnage resulting from the good grain crops of the fall of 1914 nearly offset the loss of freight business which followed the outbreak of the European war. The Union Pacific, like almost all the other large railroads of the country, suffered a loss in passenger business in the 1915 fiscal year, but offset this loss in part by a reduction in passenger train mileage. Total freight revenue in the fiscal year ended June 30, 1915, amounted to \$59,137,000, or but 5.2 per cent less than the freight revenue in 1914. Passenger revenue amounted to \$18,759,000, a loss as compared with the previous year of 8.7 per cent. There was spent on maintenance of way and structures \$10,901,000, or a fraction of 1 per cent more than in the previous year, and on maintenance of equipment, \$12,101,000, or 3.3 per cent less than in 1914; but this reduction in maintenance of equipment expenditures was less than the reduction in train mileage, the total train mileage in 1915 being 29,758,000, or 5.51 per cent less than in 1914.

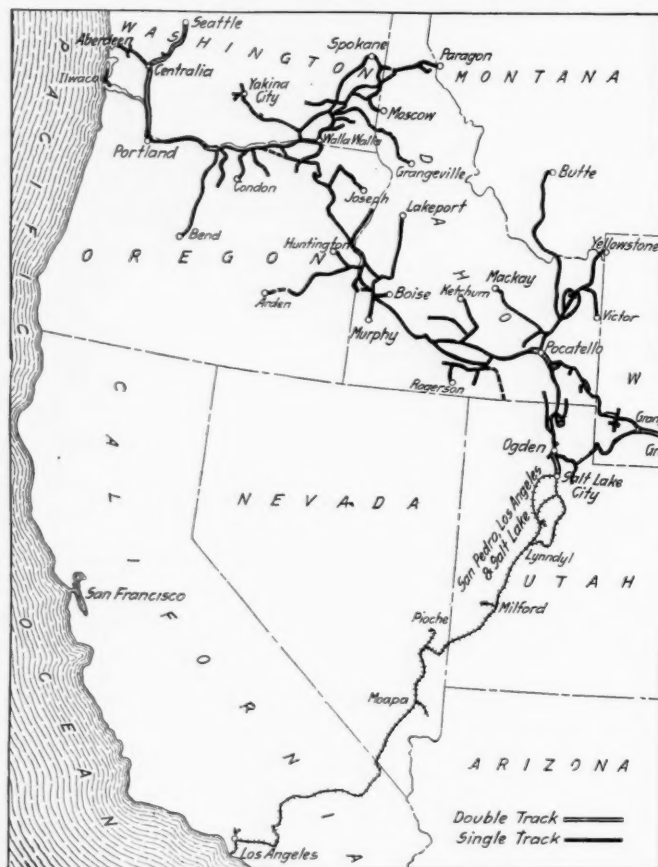
The three things that first strike the reader of the company's annual report for the fiscal year ended June 30, 1915, are the comparatively small loss in freight revenue, the ability of the company to reduce passenger train mileage in proportion to loss in passenger business, and the method by which transportation expenses were reduced 9.4 per cent, with a reduction in gross revenue of only 5.3 per cent and a reduction in train mileage of only 5.51 per cent.

The total tonnage of revenue freight carried by the Union Pacific was 16,791,000 in 1915, comparing with 17,155,000 in 1914, a loss of but 2.12 per cent. The tonnage of lumber and forest products was 2,165,000 in 1915, a loss as compared with the previous year of 711,000 tons, or 24.72 per cent. The tonnage of products of mines was 4,690,000, a loss of 428,000 tons, or 8.36 per cent. On the other hand, the tonnage of agricultural products was 5,941,000 in 1915, a gain of 889,000 tons, or 17.59 per cent, most of which is accounted for by the increase in the tonnage of grain. This tonnage in 1915 totaled 2,953,000, an increase of 713,000 tons—31.81 per cent—as compared with 1914.

The loss in passenger business was probably principally due to smaller local travel. This is indicated by the fact that a greater proportionate reduction was made in motor car mileage than in steam passenger train mileage. The reduction in steam passenger train mileage was 5.27 per cent. The total mileage of revenue motor cars was 697,000 in 1915, or 13.10 per cent less than in 1914. Some of the service formerly performed by motor cars might have been done by the substitution therefor of mixed trains, the total mileage of

mixed trains being 1,727,000 in 1915, an increase of 8.34 per cent over the previous year.

From an operating point of view the method of reduction in transportation expenses is of unusual interest. The total ton-mileage of freight carried was 6,001,739,000, or 2.7 per cent less than in 1914. The mileage of loaded freight cars was 342,667,000, or 3.3 per cent less than in 1914, and the mileage of empty freight cars was 158,219,000, an increase of 15,821,000, or about 10 per cent. The average revenue trainload was 442 tons in 1915, an increase of 11.61 tons, or 2.7 per cent. The average gross tons, including cars and contents, per freight locomotive mile was 1,153 in 1915, an increase of 60.63 tons, or 5.6 per cent. The reduction in enginemen's and trainmen's wages was just about in proportion to the reduction in train and engine mileage. Train enginemen and motormen were paid \$2,987,000 in wages in 1915, a decrease of \$239,000, or 7.4 per cent. Trainmen were paid \$2,939,000 in wages, a decrease of \$227,000, or 7.2 per cent. Total



The Union Pacific

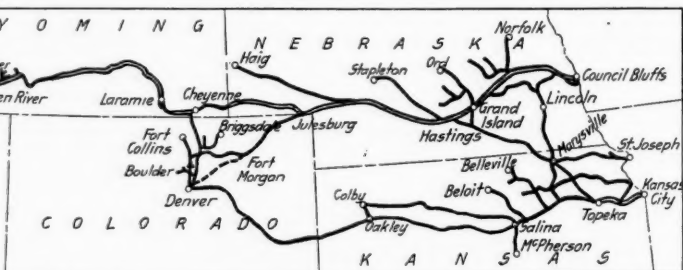
transportation expenses, however, amounted to \$23,108,000, a saving of \$2,419,000, or 9.6 per cent. The largest item of saving was in fuel for train locomotives, which cost \$5,911,000, or \$946,000—13.8 per cent—less than in 1914. The average cost per ton of coal in 1915 was \$1.96; in 1914, \$2.04. This is a reduction of about 3.8 per cent in the cost of coal per ton, so that a large part of the saving made in fuel expenses was due to a more economical use of the fuel, and this despite the fact of considerably heavier trains behind the drawbar.

The Union Pacific spent \$3,460,000 for additions and betterments, exclusive of additions to equipment, and bought \$7,854,000 additional equipment. There was also charged to capital account \$10,025,000 for equipment which had originally been bought by the Union Pacific Equipment Association and leased to the railroad company and now has been taken over by the railroad company. There were no bonds sold during the year and no change in the outstanding capital stock. At the end of the year the company had on hand

\$9,691,000 cash, no loans and bills payable except \$5,041,000 due affiliated companies, and total working liabilities of \$29,191,000.

For the first time the Union Pacific includes in its annual report a statement showing assets, liabilities, profit and loss account, and condensed income account of the following 11 companies: Union Pacific Coal Company and controlled companies, Green River Water Works, Rattlesnake Creek Water, Union Pacific Water, Oregon & Washington Railroad, Portland Terminal Investment, Riverside Homestead, Union Land, Union Pacific Equipment Association, San Francisco & Portland Steamship Company, and the Yakima Valley Transportation Company. This is a step in advance of the requirements of the Interstate Commerce Commission and is a kind of information which the stockholders ought to be given but which most railroad companies have failed to include in their annual reports.

The Union Pacific had available for dividends in 1915 \$28,404,000. The regular dividends of 4 per cent on the preferred and 8 per cent* on the common called for \$21,765,068. There was approximately \$6,600,000 over and above dividend requirements. Of this amount the Union Pacific charges specifically to income account \$1,083,000 to cover the cost of additions and betterments, which in the estimation of the management should be paid for as part of the current cost of running the plant. The expenditures under this head, which in accordance with the requirements of the Interstate Commerce Commission are charged to capital account but which the company believes should be charged against current income, are given in detail. The largest single item is the excess cost of heavier rail and track ma-



terial used for renewals. The commission's rules require the cost of this excess weight to be charged to capital account. It is interesting to have a conservative management like that of the Union Pacific openly express the opinion that this should be "in view of the condition of the company" charged to current income.

The following table shows the principal figures for operation in 1915, as compared with 1914:

	1915	1914
Average mileage operated.....	7,784	7,597
Freight revenue	\$59,136,841	\$62,407,762
Passenger revenue	18,748,559	20,540,077
Total operating revenues.....	86,958,295	91,845,305
Maintenance of way structures.....	10,900,925	10,872,882
Maintenance of equipment.....	12,101,212	12,517,154
Traffic expenses	2,061,971	2,123,140
Transportation—rail lines	22,962,552	25,351,999
Transportation—water line	145,589	174,805
Miscellaneous expenses	1,313,189	1,484,607
General expenses	2,811,419	2,885,663
Transportation for investment—Cr.....	160,142	270,028
Total operating expenses.....	52,136,715	55,140,224
Taxes	4,641,474	5,078,867
Operating income	30,180,106	31,626,214
Gross income	43,483,267	49,061,933
Net income	28,404,359	33,105,917
Dividends	21,765,068	23,762,518
Appropriations for additions and betterments...	1,083,459	.....
Surplus	5,544,032	9,331,426

*In the first half of the year dividends were at the rate of 10 per cent on the common, but income for that half year included the income on the B. & O. stock, which was distributed to Union Pacific stockholders in amounts sufficient to pay 2 per cent per year on the par value of the stock the Union Pacific held. In the second half year the rate of the Union Pacific was 8 per cent, and the Union Pacific received, of course, no income on Baltimore & Ohio stock which had been distributed.

Letters to the Editor

GOOD SERVICE AT HIGHWAY CROSSINGS

PHILADELPHIA, Pa.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the editorial, "Good Service at Highway Crossings," January 14, you say that "railroad officers do not look with favor on the practice of giving proceed signals" at crossings for vehicles to cross the track. Isn't this statement a little too sweeping? Unless I am much mistaken, a few officers, at least, have concluded that, for the absence of a signal to mean proceed is not much better practice at a road crossing than it is on the railroad, and that there is little advantage, but rather a disadvantage, in having the watchman stand with the neutrality of a wooden image or a legal fiction (the real reason for the practice), when no train is approaching.

But when one comes to the last paragraph, illuminated by the article on page 165 of the issue of January 28, "it is to laugh." If one road uses a circular red disk with white letters, another must, by all means, have oval white disks with red letters. No doubt some other road will presently have a lantern with a glass $1\frac{7}{8}$ in. in diameter. At this late day shall we, in the matter of these crossing signs, go through the whole range of fancies that has covered the country with every conceivable shape of switch target? C. C. ANTHONY.

CLERKS AND OFFICE BOYS

HAILEYVILLE, Okla.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article on the railway clerk which appeared in your issue of November 12, in my opinion, is more theoretical than practical. The office boy must not be abolished. He is too important. A high school graduate would not do what the office boy does, nor do it so well; it would affect his pride. Again, what is the use of paying \$40 a month for what you can have done for \$25? That is the great trouble on the railroads today; higher salaries are paid for certain classes of work than are necessary; but this comes about because detail work which can be done by a cheaper man is put onto a clerk who is drawing a higher salary.

The \$25-a-month office boy is just as capable of becoming familiar with the business of the office as a \$40 high-school graduate, and in many cases will do better work. How many of our presidents, general managers, etc., have come up from office boys? Why do away with this job, when at times it means a lot to a young lad who has to take care of his mother? There is just as much logic in doing away with the office boy as there would be in doing away with the call boy and putting a switchman to work to do the calling and paying him switchman's pay.

When the thing is all sifted down, is not the clerk paid about as well as any other man on the railroad, when a comparison of duties is taken into consideration? What is he responsible for? What is the section foreman responsible for and what salary does he make and what does he have to do to keep this salary? How does the clerk's salary compare with that of the telegrapher, and how does the responsibility compare? The operator is compelled to learn his business by working around a station for a year or more without any salary, or by going to some school and paying out hard-earned money, and then is required to work nights for a long time. If he wants a day off he has to lose it out of his salary, whereas the clerk can always make arrangements with others in the office force to be away a day or two when necessary. If he wants transportation he can generally get it, while the operator or section foreman may be told that "it is not consistent to request it at this time," etc., etc. I do not want to be under-

stood as "knocking" the clerk, as I spent eight years in that capacity, but I believe in these things being handled according to their merits.

J. L. COSS.

ARE RECEIVERS' FUNCTIONS POLITICAL OR JUDICIAL?

INDIANAPOLIS, Ind.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

My attention is called to your startling statements that the federal judiciary now is operating 41,988 miles of railroad with a total capitalization of \$2,264,000,000. The statement is startling as well for the fact that the judicial function of the government should be thus used, as it is startling for the magnitude of the wreckage. Is it not clearly antagonistic to our conception of the orders of government that the judiciary should be thus engaged in duties which are purely ministerial and political? When these great carriers were in health and tranquil, if not prosperous, their administration was subject to the political, as distinguished from the judicial, authority of the government. The Interstate Commerce Commission is wholly without judicial power; it is purely administrative in its functions, and belongs clearly to the political as distinguished from the judicial division of the government. It seems strange that we have repeated evidences of confusion in our conception of government. Not only have we this instance of mere tranquillity in the state of the railroad being the *Causa Causans* of shifting a subject between the two departments of the government—the political and the judicial—but in the case of national banks this same element of tranquillity cuts no ice. Whether a national bank be prosperous or be passing through liquidation the supervision is completely in the treasury department and the treasury department is a political division of the government.

The situation appears to me to present evils hurtful alike to investments and to the people.

1. Wrongs to investment may be found by looking in this direction: When the judiciary is called upon to act in such cases it acts in the face of emergency and on the spur of the moment. Usually some favorite is rewarded and the element of competition is disregarded. Such men translated quickly from the modest walks of life into places of great power and enormous possibilities often become perverted by their unleashed ambitions and are worse than useless. Their star is personal attainment and the welfare of the investment is a secondary consideration. The business of railroad management in this country has become an art of the superlative degree. It requires profound study of questions that lie wholly beyond the realm of conception imposed upon men in other walks of life. Railroads in prosperity exact obedience, discipline, skill and all the highest orders of efficiency from a class of men who are the peers of our best types of manhood in other vocations. Such men ought to be on the eligible lists of government employees and when a court exercises its proper judicial function of deciding whether a railroad should be sequestered for the benefit of the trust it was created to perform, then the political division of the government ought to step in and take control and conduct the affairs of the company, through the agency of experts, to the necessary and proper conclusion.

How much fairer and better it would be if a President of the United States were permitted to invite into conference men like Mr. Hill, Mr. Rea, Mr. Brown, and others notable for their attainments, and say to them: "Gentlemen, henceforth the department of commerce will administer the affairs of railroads which are in disorder. I wish you to nominate for my consideration a number of men, as many as you prefer, whom your experience has proven to be competent and qualified to enter the government service where they will be available to conduct the troubled affairs of these vast enterprises to an end, just alike to the investor and to the people."

Impressed with such duty, would not any of these masters in the art of commerce give his best talent to the President? Wouldn't there be greater and better assurances of desirable

ends if that method were pursued than is to be hoped for under the present practice where a few lawyers, with their axes to grind, invade the chambers of a federal judge and impose upon him their little lists of cooked supplicants? The question largely is up to the leaders of railroad industry. The people will support them in any just endeavor.

2. Wrongs to the people may be found by looking in this direction: When our government was established the people expressed their purpose to be in control. To that end they wrote it into the Constitution that the entire house of representatives and one-third of the Senate should be returnable to the people every two years. And this was done because provision had been made whereby all the purely political powers of the government had been lodged in the Congress. By similar prescription the administrative department, whose functions are secondary to those of Congress, but are also political, was made returnable to the people every four years. But the judiciary was to perform judicial rather than political functions. Therefore, the judiciary could not invade the purpose of the people to control the politics of their government. Therefore, the judiciary might be appointed and for a life tenure expressed in the words "during good behavior." It may fairly be inferred that there was a compact to sustain this situation; that by the terms of this compact the judiciary was to be kept out of politics by the people and in return for that consideration the judiciary would keep itself out of politics and would not invade the Constitutional prerogative of the citizen in his right to political supremacy. Railroad control is a political power. Every interstate commerce case decided by the Supreme Court is proof of my statement. If these great opinions of the Supreme Court are true, and they are true, is not the federal judiciary, in the case your figures instance, breaking faith with the people, by exercising political power? If that be true has not the federal judiciary brought itself within the terms of the original prescript of the people, "We will control by our suffrage every agency of government that exercises political power"? From this point of reckoning, how far is it to a justification for the clamor for an elected judiciary; for the judicial recall; for the recall of judicial opinion?

Mr. Railroad Man, there is smoke coming out of your attic! It looks to me like your house is afire! You had better investigate and act quickly!

WILLIAM V. ROOKER,

Counsellor in Utilities, Trust and Commerce Cases.

SLIPPING OF LOCOMOTIVES

PARIS, France.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read, with much interest, the discussion which has taken place during the past few months in the columns of the *Railway Age Gazette*, relative to the factor of adhesion. However the opinions as to the proper factor of adhesion may vary the limiting condition is generally accepted to be the slipping of the locomotive drivers. In this connection it may be of interest to note that many simple locomotives in France are provided with a gage in the cab showing the steam chest pressure, intelligent use of which materially assists in preventing the locomotive from slipping when operating at low speed on a hard pull. By watching the gage and noting at what pressure the slipping begins the engineman is able to manipulate his throttle so that the pressure in the steam chest will never rise beyond the slipping point and so obtain the maximum traction which the adhesion will sustain. I have seen an engine which was on the point of stalling taken in charge by a man who understood the use of the gage and brought safely over a hill by careful manipulation of the throttle.

In a communication signed by Gordon Baxter which appeared in the issue of October 8, 1915, the statement is made that the variations in tractive effort are reduced as the cut-off is advanced. This is true up to a certain point, but when

running slowly there is a certain cut-off—roughly between 60 per cent and 75 per cent—where the variations are a minimum. When the cranks are on the eighths the turning moment is greatest when the lever is in full gear position. It therefore follows that if the cut-off in one or the other of the cylinders takes place before the cranks reach the eighths the steam in that cylinder will be expanding and the pressure consequently reduced. One piston only will be acted on by the full steam chest pressure at the point where the combined effect of the two cylinders is greatest and the turning moment will therefore be made more uniform. The point of cut-off which will produce the most uniform turning moment will vary with different conditions, but may usually be found by trial in a very short time. This is not a mere theory; the writer has put it to practical test.

W. G. LANDON.

A PLEA FOR THE DRAFTSMAN

WASHINGTON, D. C.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with much interest the numerous letters on the status of railroad clerks that have recently been published in the *Railway Age Gazette*. I should like to say a word concerning a class of men whose condition at present seems to me to be fully as unsatisfactory as that of the clerks. I refer to the draftsmen in the mechanical department.

The whole force in a drawing room is to a great extent sidetracked, so far as advancement to the higher positions on the road is concerned, but that is no reason why those in charge of a drawing room should not try to make the work attractive for the men under them. Any work of this kind is bound to be more or less monotonous, and the fact that it demands close attention and extreme accuracy makes it tiresome, even for those long accustomed to it. Usually the chief draftsman takes the attitude that the men under him are not worth bothering with, for he knows that they are not usually of the timber from which officers are made; but granting that this is true in most cases, it is no reason for "rubbing it in," instead of giving the men some much-needed encouragement, and telling them once in a while that their work is in many ways one of the most important in their department.

Be sure that the chief draftsman takes an interest in the work of the men under him. Let him work with the men, so to speak, and decide what class of work each man is best fitted to perform. Some men are not as good as others at laying out new work, some are better at a quick job requiring but little accuracy, while still others are good at working out intricate details. Above all things let the men remember that the drawings are the plans for which a real, concrete piece of machinery is to be constructed. Teach them to think in terms of the finished product, not in terms of the drawing board.

If the plans for a new locomotive are gotten up in the office, when the new engines arrive in the yard, make it a part of the duty of the men who worked on those drawings to go down and see how the thing looks when finished. It will take them off the board for a short time, but it will be money back for the company in the end. The men will keep in touch with the actual railroad end of the business, and feel themselves a part of the whole system, a feeling which comes more naturally to the men on the road than to those whose time is spent in the office. I think if once a month one of the men could be sent off for a week to inspect some piece of work on the road it would do a lot towards making a more contented, wide-awake and efficient drafting force.

HUGH G. BOUTELL.

FIFTY-ONE YEARS' SERVICE ON AN IRISH RAILWAY.—John Murray, an engineman on the Great Northern Railway of Ireland recently retired after 51 years of service. He had driven an engine since 1872.

The Malady of the Railways of the United States*

The Present Condition a Serious Menace. What Is Necessary to Insure Adequate Transportation System

By Howard Elliott

Chairman and President, New York, New Haven & Hartford

It is to the interest of the public that the railways be "ready to serve" at all times and able in times of emergency to carry the "peak load." This is not the case today, and the fact that it is not is a serious menace to the present and future welfare of the United States.

Today there 100,000,000 people in the land who must be fed, clothed, sheltered, kept warm and many of whom travel for health, pleasure and business. The railway systems are in many places overtaxed in doing this work. What will be the conditions when there are 150,000,000 people to be served? That time is not far off, either measured in the life of the nation, or by the time and energy that must be spent in increasing the capacity of the railway plant to turn out the necessary transportation.

This means an addition of at least 50 per cent to the number of tons of freight moved one mile and the number of passengers moved one mile. It means that the railways must be not only well and strong with their present facilities, but also that they must be nourished and their energies and powers conserved and increased.

In olden times there was a system in the practice of medicine known as "blood letting." It was prevalent for many hundreds of years. It was warranted to cure all the ills to which human flesh is heir. The operation often caused the patient to faint; in many cases it resulted in great weakness, and often in death.

Some critics have pointed out that the railways have suffered from serious difficulties which may be likened to these human ills, and for years the people, by means of various regulatory measures, have been trying to cure the patient. A very large number of these measures have taken the form of "blood letting," not only in the spring and fall, but all the time. A taking away in one form or another of the sustenance needed by the railways—a course of treatment which weakens the transportation system of the country, and if continued much longer, will, in many cases, end in economic dissolution or bankruptcy.

Whatever the reasons for the present malady of the railways, two facts stand out prominently in the history of the railways of the United States for the year 1915. One is that less mileage was built in that year than in any year since 1864. There have only been three years since 1848 when there was a smaller mileage of new railway constructed than in 1915. The other fact has to do with the amount of railway mileage in the hands of receivers in 1915.

REDUCED INVESTMENT IN RAILROAD BONDS

The practice of insurance companies and banks is the highest evidence of investment value. They put the money that they hold behind their opinions, and without this money there is scant picking in the money market for those who need cash. For that reason exceptional interest attaches to the investment standards revealed in a recent statement of the banks of the United States. According to the report of the comptroller of the currency the investments of 27,000 banks in railway securities during last year increased 1.73 per cent. That is the smallest increase for any class of security, national bonds excepted. The favored investment was public utility bonds, which increased 13.70 per cent. The largest increase in total was in state, city and municipal bonds, but

their percentage of increase was only 10.31 per cent. Savings banks added \$55,000,000 of public utility bonds, and reduced their holding of railway bonds by \$20,000,000.

Many thoughtful men in the United States are filled with anxiety over the future, now that this country, whether it wishes to or not, is being forced into the position of a world power and compelled to take its part in international affairs to a greater extent than ever before. There are several kinds of "preparedness." All of our industries must be prepared—our young men must be prepared—labor must be prepared—capital must be prepared—our army and navy must be prepared, the government itself must be prepared—and, last but not least, our railways must be prepared. In a time of profound peace in this country, the railways are congested and cannot carry satisfactorily the total load. What could they do in their present condition if the added burden of war were thrown upon them? Many industries would have to stop because the railways' first duty would be to handle the men and material incident to war. Railway preparedness is, therefore, a vital "sine qua non" for adequate national preparedness.

NEED OF CAPITAL

The serious freight congestion of 1906-1907 and the recent one emphasize the fact that the railways have a very small "factor of safety" with which to meet the strain of a sudden and increased load. It is difficult to estimate how much money will be necessary to bring the railways of the United States up to the point of efficiency demanded by the business of the country, but it is likely to be more than any of the estimates yet made.

In order to attract capital an undertaking must appeal to those who have capital to invest. Probably the most important factor in the investment of money in railway securities is the item known as net operating income, for out of this must come the return paid upon invested capital. The net operating income of the railways of the country for the year ending June 30, 1914, was \$849,122,647. This was \$8,550,000 more than was reported in 1907. In the meantime, \$4,500,000,000 of new money had been expended by the railways, and yet after that expenditure of \$4,500,000,000 on new facilities, the net operating income increased but \$8,550,000. This represents a return of less than two-tenths of one per cent. Road and equipment had been increased by 25 per cent. Net revenue had increased about 1 per cent.

These billions were invested in the hope, so completely disappointed by the fact, that the additions to plant would earn a return. The result, naturally, has been to discourage additions and betterments. In the calendar year just ended, the freight cars built were the fewest since 1904, with the single exception of 1911; the passenger cars the smallest since 1902, except 1908; the locomotives the smallest since 1898; the construction of new miles of first track about 65 per cent of the smallest since 1893. It is the persistency of this trend that has attracted attention. Large tonnage and large gross earnings have not blinded the investor to the underlying financial problem, and he has placed his funds elsewhere. The problem has before been vivid in periods of business depression, but it is now coming to be recognized as a continuing menace in boom and slump alike.

In order to meet the demands of peace—to prepare the

*Abstract of an address before the Chamber of Commerce of the United States, at Washington, D. C., on February 8, 1916.

railways for the peaceful needs of industry—the most general estimate is that the railways should spend for increased facilities at least \$1,000,000,000 a year for several years to come.

CAPITAL, LABOR AND BRAINS

It is trite to say that capital cannot get along without labor, and that labor cannot get along without capital—and yet capital and labor both, at times, forget this all-important fact. Both, also, pay too little attention to the fact that neither of them can get along at all without brains—brains to plan, brains to supervise, brains to direct, brains to be fair and brains to see that the great public interest in these large industrial corporations must be constantly considered.

You are quite aware that one of your great difficulties in conducting enterprises, especially large ones, is that of obtaining men of health, courage—moral and physical—untiring industry, good judgment, and brains and experience. The lack of men with ability to direct and supervise is one element of weakness in the effort to accomplish preparedness in all its forms. Of late years this has been true of the railways. The service has been, and is, so severe that men drift into it rather than select it as a life work, and while there are thousands of splendid men in the service, there are not enough. A national policy of helpfulness to the railways should attract more brains to the business by reducing the really very heavy mental, physical and nervous strain under which nearly all officers of railways are obliged to work under the present conditions of undeveloped facilities and a more or less unreasonable and hostile attitude on the part of the law makers and public.

Capital has been mobilized in this country and in the main, with great benefits to all. It has been constructive, not destructive, because in no other way could it earn a return. It has been bold, and, at times, foolish. It has made its mistakes because it has been directed by human beings who, at times, have failed to give due weight to the public good. As a result, public opinion was aroused, and this irresistible force decreed that organized capital, or capital in a mass, must subject itself to certain regulatory measures. Things that were considered absolutely essential to the conduct of business 25 years ago, are now frowned upon and even classed as crimes. The rebate and pass days have gone from the railway world.

Railways and business, however, have adjusted themselves to the new conditions. Laws affecting railways and business are now being worked out that would have been considered impossible a generation ago, and yet, in the present complicated modern life, some are doubtless necessary. When the unworkable features of some of these laws are eliminated, business will adjust itself and capital, although perplexed and frightened, will go forward with its work: because the country must perform its functions and it must be as fair to capital as capital must be fair to the country.

A natural sequence to the organization of capital was the organization of labor. Capital and the public have been partly at fault for not realizing at times the changing conditions. Lack of brains in some of the men who supervise and direct others has contributed to the dissensions. Labor, at times, has been treated with too little consideration. As a result, labor organized in order to present in forcible and concrete form, its views of the industrial situation, and also to record the natural desire of every healthy man to improve the conditions surrounding himself and his family. But just as organized capital was forced to be controlled and regulated in the interest of the public, so organized labor must be controlled and regulated. No one can object to organized labor unless its acts injure the general welfare of the public. It, too, must be constructive and not destructive. When it tries the boycott, in an effort to stop the wheels of progress, to be unfair in its demands, to be unwilling to have those demands considered calmly by unprejudiced people and to abide by the decision, then the mighty will of the people will

be aroused and a means will be found to retain the good features of organized labor and eliminate the bad.

The business and the welfare of the country are now confronted with concrete evidence of the great, and, at present, unregulated power of organized labor. Nearly 400,000 men, about the highest paid men in the railway service ask that their wage day be 8 hours instead of 10, and for any work over 8 hours that they be paid one and one half times the hourly rate for the 8 hours. It is announced that they have decided to make this demand upon the railways this spring, and if it is not granted a strike will be ordered on all the roads in the United States and Canada, and, furthermore, that they will not consent to any form of arbitration.

THE THREATENED STRIKE

The number of men involved is between 350,000 and 400,000; total wages paid this class of railway employees, 1914, \$389,000,000; total operating revenues of roads affected, 1914, \$3,047,109,908; total expenses, \$2,200,313,159; total capital securities, \$20,193,875,000; proportion of railway revenues paid labor, 1914, 45.3 per cent; 1907, 41.42 per cent.

The labor leaders propose that "8 hours or less" constitute a day instead of "10 hours or less," with overtime paid for at time and one-half. The railway managers estimate this would increase operating expenses 25 per cent to 40 per cent. They claim:

That because of wage increases between 1910 and 1914, \$238,000,000 was added to payrolls for the same number of men.

That the proposed schedule would be in effect an increase of 25 per cent in freight speed basis for wage computing.

That it would mean an increase of 87½ per cent in overtime rate.

That about 1,500,000 other employees would get no benefit.

That the 662,000 stockholders of the railways of the country now get less than 2 per cent of gross earnings.

That employees now get 45.3 per cent of gross earnings.

That employees involved, although numbering only 18 per cent of the railway army, now absorb 28 per cent of the railways' payroll of \$1,500,000,000 a year.

The money necessary to meet this demand could be obtained only by either a reduction of wages of other employees, or by reduced payments of interest and dividends, or by curtailing betterment expenditures needed by the public or by increased passenger and freight rates.

This movement raises a serious social and industrial question and deserves deeper thought and consideration than it is now apparently receiving from the public at large, the law makers and the government. It has a very direct bearing upon the ability of the railways to recover from their malady, and to get ready for the work of the country. Must not public opinion devise some means that will make impossible even the conception of a plan to paralyze the entire railway system of the United States?

Today labor says: "I can do with my own as I like, and if I want to stop work, that is my business." Only a few years ago capital said the same about various unjust discriminations and unfair practices, and the public stopped it.

Does not a man, when he elects to earn his living by working for a public service corporation, enter into a moral obligation to the public to keep that corporation at work pending a dispute over wages and working conditions until that dispute is settled in an orderly manner? Should that obligation be made not simply a moral one, but a humane, patriotic and even a legal one? That obligation would be no more an interference with human liberty than it is to insist that railways cannot vary rates. A way should be found to adjust such matters, and you and those you represent can be potent in finding the way.

Another thing: This is a country of great distances, and rates, both freight and passenger, should be kept as low as

consistent with good wages, good upkeep of the properties, good and constant additions to the properties, and good returns to the capital in order that new money will constantly be invested in the business. If wages are raised and then rates are raised, and this process constantly continues, a condition will arise which will send the cost of living much higher than ever before; business of the country will be checked, and development stopped, and such an outcome would be as bad, if not worse, for labor than for capital.

WE MUST WORK MORE HOURS, NOT LESS

Another tendency of the times deserves thoughtful consideration, for it has a very important bearing on the malady of the railways. This is the tendency so generally discussed, that individuals should do less work per day. Many would like this, but everyone owes to his country a duty, especially at this time, to give the best that is in him, physically and mentally, and thus help to carry the country through its changed conditions. In most kinds of work it is no strain for a healthy man to work 10 hours a day, but there is now a very strong drift to an 8-hour day and even less. The nation is confronted with more work than ever before; ships to build, factories to enlarge, railways to complete, new foreign business to be attracted, and help to be extended to the unfortunates on the other side. There are about 30,000,000 men at work; if they work 10 hours a day, that is 300,000,000 hours a day, or 93,600,000,000 hours a year. If they work 8 hours, it is 74,880,000,000, or a difference of 18,720,000,000 hours a year. At 8 hours a day this means that about 7,400,000 more men must be employed to do the work that could be done by the 30,000,000; and where are they to come from?

To the extent that is represented by these figures, the new work that Uncle Sam should do in building his navy, improving his railways, expanding his commerce, will be checked. The nation is busy, and loyal citizens should cheerfully work "overtime," instead of less time. We must promptly do those things that must be done if we are to occupy the place in the world which world events have forced upon us, and if we are to help our children and their children. This tendency to shortened hours has also a very direct effect on the malady of the railways and any cure therefor.

EXCESSIVE LEGISLATION AND REGULATION

I believe the majority of the people in the United States think that privately owned railways, honestly and efficiently administered, and subject to intelligent and reasonable regulation by public authority, is far better policy for the country than government ownership. Because of sins of omission and commission by both owners and regulators, this malady of the railways exists, and many remedies have been tried, and there is much confusion and discussion because of them. Too many alleged cures have been hastily tried, and too many "hobbles" fastened upon the roads. This tendency to extreme law making applies to all forms of business, as well as to the railways. When a man is sick, he gets the best doctor at his command; if he builds a bridge, the best engineer. But in this delicate and difficult matter of regulating business, the country has not been able always to obtain the most experienced men, and this is said without disparagement to many good men who are in the regulating business.

UNIFICATION OF RAILWAY LAWS

During the past year there has been a unified and standardized banking and currency system tried, and not found wanting. The federal reserve system marked perhaps the farthest step in advance towards nationalized business activity yet undertaken, and its successful operation is ample proof of the soundness of the theory upon which it was built.

But there are yet other steps to be taken before the ideal of economic unity is worked out. Not only is it desirable that the commerce of the country, as represented by your organization, should be united in spirit and purpose, but it is

equally necessary that the carriers of that commerce should be operated under a harmonious system of regulation having due regard to their functions as the bearers of interstate trade and the servants of the entire nation.

Today, the carriers of interstate commerce are the servants of 49 masters, of conflicting powers and desires, and if it be true that no man can successfully serve two masters, how confusing and inefficient must be the mental state of him who must serve the United States and a number of sovereign states.

The result of this conflict between state and nation has been a great waste of energy and loss of power to serve the public. The regulators have been so anxious to take on new work that they are overburdened, and questions in dispute are not disposed of promptly and satisfactorily. One result of this excessive regulation has been to increase the price to be paid for new capital needed in the business. It is obvious that as a result of governmental policy and economic conditions combined, the railways of the country have suffered materially, not only to their own loss, but to the vast detriment of the business community.

The deluge of laws and regulations and the divided authority is another cause of the present malady of the railways, and the public should consider it and take steps to improve this feature of the situation.

THE PUBLIC MUST REALIZE

Since 1887 the country has been passing through a period of expansion and exploitation, with periodical setbacks—a period of investigation and correction of some abuses, and today, from a variety of causes, the transportation agencies are not adjusted properly to the needs of the country. The country now should turn from its punitive policy, because errors of the past have practically been eliminated, and there is ample protection against a recurrence of them in the future, apart from the fact that there is a higher standard of business ethics than ever before. The country should enter upon a period of constructive work with the owners and managers of the railways.

The malady of the railways cannot be cured until:

1. The public thoroughly realizes the fact that the railways are no different from any other kind of business in their ability to increase constantly all kinds of expenses and at the same time reduce or not to advance the price of the article they have to sell—transportation, and keep the plant adequate to the needs of the country.
2. The public realize that extreme and conflicting regulation is hurting them.
3. There is reasonable control and regulation of the great organizations of labor that are engaged in the work of various public utilities, including railways, upon which the welfare of society depends.
4. Instead of passing additional laws, an account is taken of those now in existence to be followed by classification, amendment and repeal some of them.
5. It is realized that the railways are more and more national and less and less state in character, and that state control and regulation must be subordinate to national control.
6. The nation has a right to expect of every man that he give the maximum of physical and mental effort in whatever position he occupies.
7. Men of commerce give more attention to these very important matters and use their influence with law makers and executives in an effort to bring about a more reasonable treatment of all business, including that of the railways.

The railways are your servants, and you can do more than any other body to help cure their present malady and make them strong. Time is vital because for the last 10 years the additions to the properties, large as they have been, are not large enough, and rapid work must be done in the next 5 years to bring them up to the mark. Railway owners and

Many railroads are prosperous today—according to the books. Railroad prosperity in the United States today is more apparent than real. The increased business is recorded in bigger gross earnings. But the net earnings have been achieved by the most rigid economy. The railroads are on a diet. They are practicing too drastic an abstemiousness.

The railroad question is one the American people must face. They must meet it, not in a spirit of antagonism, nor yet in a spirit of "All right, gentlemen! Tell us what you want and help yourselves!" But they must meet it as a business proposition of paramount importance in a business way.

Two Large Concrete Viaducts on the St. Paul

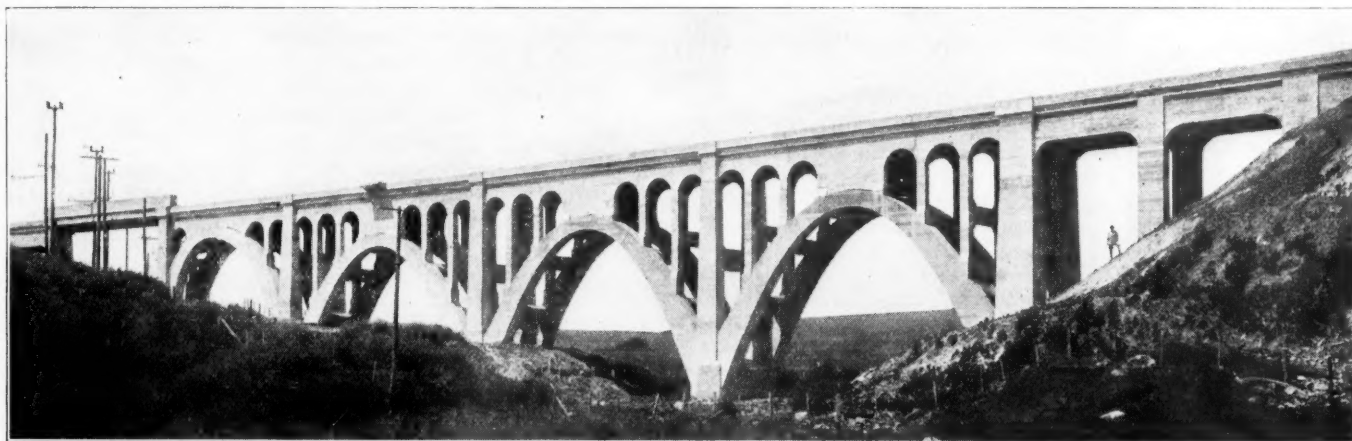
Structures of the Open Spandrel Arch Type Have Recently Been Completed on the Puget Sound Line

The Chicago, Milwaukee & St. Paul recently finished two large reinforced concrete arch viaducts on its Puget Sound line, 2½ miles east of Rosalia, Wash. These structures replace a frame trestle 60 ft. high and 2,177 ft. long, which was one of a number of crossings over Pine creek built in 1907, when the line was extended across the state of Washington.

The line is on a 3-deg. curve to the left and in addition to

ment 334 ft. long between. The filling was all completed before any definite designs had been decided upon for the permanent structures.

The site was one where considerations of appearance had to be taken somewhat into account, as the structure would be seen from the two other railways and a county highway, crossing under the bridge on the west bank of Pine creek.



South Elevation of the West Structure

bridging the creek it crosses the Palouse line of the Northern Pacific and the tracks of the Spokane & Inland Empire located on the east and west banks of the creek, respectively. The distance between the two railroad crossings is about 850 ft. and the original plans for a permanent structure presumed a viaduct of steel or concrete of sufficient length to cross both railroads, but when it was decided in 1911 to "daylight" the Rosalia tunnel located 400 ft. east of the east end of the trestle, more filling material was available than could be

The foundations are also favorable for arch construction. Solid cemented gravel was encountered from 12 to 19 ft. below the ground surface for the east structure while rock at a depth of 5 to 20 ft. was available for the foundation of all of the west structure except the west abutment and two westerly piers, which were founded on stiff clay.

THE EAST STRUCTURE

The easterly structure serves solely as a crossing over the



Both Structures as Seen from the Southwest

utilized in filling that part of the trestle east of the Northern Pacific crossing. It was decided, therefore, to use the surplus filling between the Northern Pacific track and the east bank of the creek. Thus, there were two openings with an embank-

Northern Pacific tracks and is therefore the smaller of the two. It consists essentially of a parabolic arch of 100-ft. clear opening and is flanked by trestle abutments consisting of concrete girder spans on high piers, a type developed and

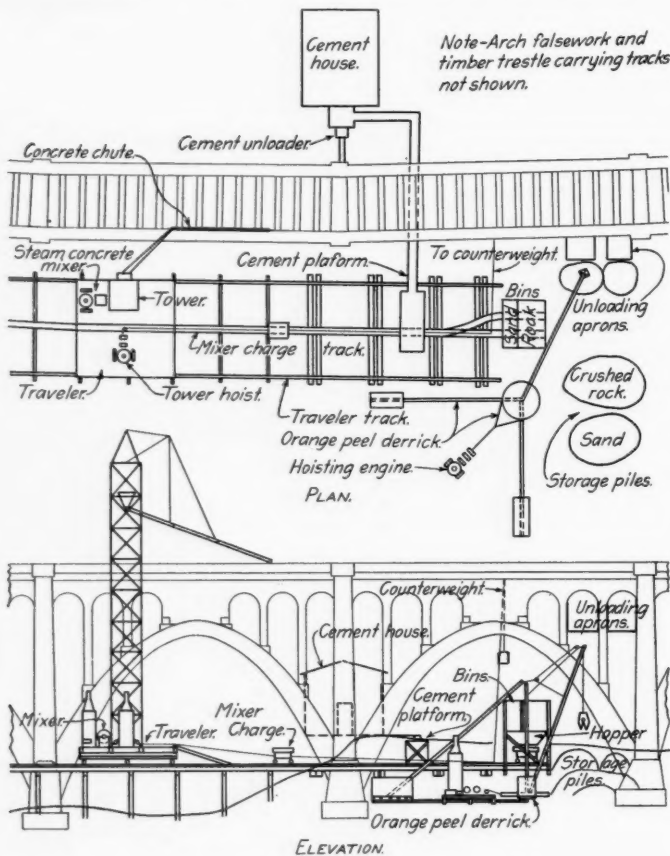
extensively used on the St. Paul. The entire structure with the exception of the floor, is divided along its longitudinal axis into two separate units connected at intervals by horizontal transverse ties. Thus the concrete rings consist of two separate ribs 4 ft. wide spaced 15 ft. 3 in. center to center. They are 3 ft. 6 in. deep at the crown, increasing uniformly to 9 ft. 8½ in. near the springing line. Six ties connect the two ribs.

The ribs are surmounted by spandrel walls 1 ft. 6 in. thick, pierced on either side of the crown by spandrel arches of 8 ft. span, separated a sufficient distance to form columns between them 1 ft. 6 in. by 2 ft. 1 in., resting on the arch ring, and leaving an unbroken wall over the crown of the arch for a length of about 30 ft. The track floor is carried on concrete floor beams spanning from wall to wall and spaced 5 ft. ½ in. center to center. They are 1 ft. 6 in. wide, and 4 ft. 2½ in. deep and carry unit constructed reinforced concrete slabs 1 ft. thick, 5 ft. wide and 13 ft. 11 in. long (transverse to the bridge axis). The spandrel walls extend above the slabs to the level of the base of rail to form parapets and to retain the ballast placed on the slab floor.

In order to insure independent action on the part of the arch rings and to provide for temperature changes, the spandrel wall has been cut into sections by 5 vertical joints, one through the solid wall at the crown of the arch and the

below the plane of the embankment slope, but the rear columns, which are almost completely buried in the fill, have no ties, the presence of the embankment and the methods adopted for their construction being unfavorable for the building of ties.

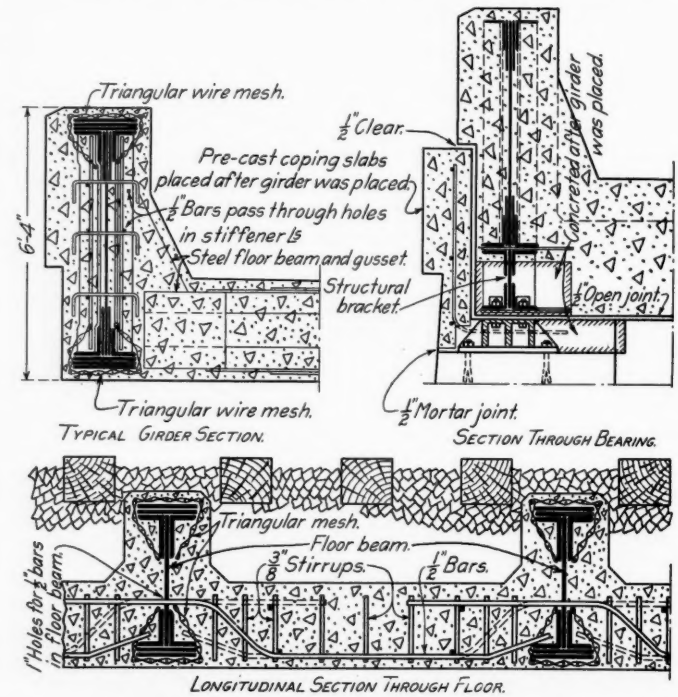
The columns are connected longitudinally by continuous reinforced concrete girders, the architectural treatment of which corresponds to that of the top of the spandrel walls over the arch. The floor system of the abutment is like that



The Concreting Plant

others through the first and third spandrel arches on each side. In consequence the latter are arches in appearance only; structurally they are reinforced concrete girders. It was also found desirable to carry the solid portion of the spandrel wall on the arch ring at six definite points, as indicated in one of the accompanying photographs.

The piers upon which the arch ring is supported are surmounted by pairs of concrete columns 3 ft. 6 in. thick. The other columns of the approach are 2 ft. 9 in. thick, the intermediate ones being 5 ft. and the rear ones 6 ft. wide. The intermediate columns are braced transversely by struts just



Typical Sections of the Encased Girder Span

on the arch, except that the floor beams are further apart and the slabs are wider in consequence.

THE WEST STRUCTURE

The west structure is 502 ft. 4 in. long and crosses the creek, the Inland Empire tracks, a country highway and a farm crossing from east to west in the order given. Commencing on the east, it consists of an abutment of the same type as that of the east structure, 3 arches of 68 ft. 6 in. clear span, an unsymmetrical skew arch span, a skew through girder span and a combination trestle and U-abutment.

The details of the three main arches correspond closely to those of the 100-ft. arch in the other bridge except that they are proportionally smaller. The next arch to the west is unsymmetrical in that the west springing line is 14 ft. higher than the east one and the span of the south rib is 50 ft. 7 in., while that of the north one is 61 ft. 2¾ in. This arrangement is necessary on account of the ground slope, and to provide clearance for a skew highway crossing and also because of the need of a skew span over the Inland Empire tracks immediately to the west which forms one of the most interesting features of the structure. Because of the elevation of these tracks relative to those of the St. Paul and because of the clear opening required, it was necessary to use a through plate girder span with a relatively thin floor. To preserve the unity of appearance of the structure the span was completely encased in concrete. An unusual floor design was evolved in order to secure the necessary minimum thickness. Floor beams, following the usual practice in through girder design are spaced 5 ft. 1 in. center to center. These, as well as the girders are completely enclosed in concrete while the space between the floor beams is occupied by reinforced concrete slab construction spanning longitudinally

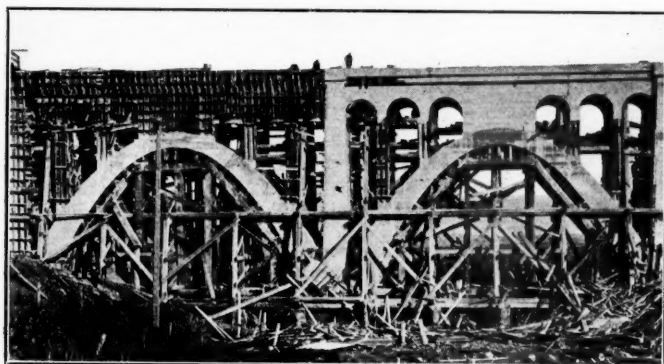
from beam to beam, holes being punched in the webs of the beams for the passage of reinforcing bars. These slabs are $12\frac{3}{8}$ in. deep while the enclosing floor beams are 2 ft. $1\frac{3}{4}$ in. deep. Thus there is a trough shaped space between the beams for the reception of ballast, drainage being provided by weep holes next to each girder.

Owing to the skew, the end bearings of the two girders are 25 ft. 2 in. apart on the piers and three floor beams have free ends. To meet this condition, end struts of built-up I-section were provided to connect the two girders and carry the free ends of the floor beams. The girders are carried on cast iron bearings and three smaller bearings are provided at intermediate points under the struts, the bearings being all encased in concrete. Obviously this design did not permit of completion in its final position and under traffic; consequently the steel work was erected on falsework alongside its final position and after all concrete work had been completed it was rolled into place on small girder carriages or rail dollies. The motive power was supplied by means of lines from the drums of a bridge erecting derrick.

The west abutment consists of a combination of a concrete girder span accommodating a farm crossing, and a filled U-abutment. The construction of the girder span is similar in detail to the trestle abutments, the floor being carried on unit slabs. The filled portion of the abutment consists of enclosing walls held together by the rods encased in concrete cross walls.

CONSTRUCTION METHODS

The excavation for the pier foundations involved openings relatively narrow and deep. These were made in most cases



Portion of West Structure Showing Character of Centering by sinking open wells which were curbed with old ties. For some of the end bents, the depth of these wells was nearly 50 ft.

The concrete for both structures was supplied from a single plant located at the larger structure. The concrete for the smaller one was spouted into cars and hauled over a narrow gage track by a gasoline locomotive. The arrangement of the plant for concreting the larger structure is shown in the accompanying drawing. All material was delivered in cars on the bridge overhead. The cement was lowered to a cement house located underneath and just south of the bridge by an endless belt with a friction brake, by means of which the sacks were lowered at a slow speed to prevent damage by tearing or burning. The stone and sand were delivered in hopper bottom cars and spouted to the ground through chutes. They were handled to storage piles and to hopper bins by means of a stiff-leg derrick. The mixer and an 80-ft. tower, with engines for running them were mounted on a traveler or platform running on a 24-ft. gage track paralleling the bridge for a distance of about 210 ft. by means of this traveler and a spout at the top having a reach of almost 40 ft., it was possible to place almost all of the concrete without any additional handling. Material for the mixer was measured out of the hopper bin, previously mentioned, into small cars which were hauled to the mixer by the tower hoisting engine,

a counterweight arrangement being provided to return the car to the hopper. Cement was handled in the same manner.

The falsework for the arches was rather complicated, as shown in one of the accompanying photographs. This is accounted for by the necessity of keeping the arch centering independent of the falsework carrying the track. At the points where the two railroads cross underneath the structure on sharp skew, the situation was particularly complicated.

The two bridges were designed and constructed by the engineering department forces of the St. Paul under the direction of C. F. Loweth, chief engineer. All plans were made in the office of H. C. Lothholz, engineer of design, Chicago; and the construction was under the immediate direction of J. F. Pinson, assistant engineer of bridges and buildings, Seattle, Wash.

FRENCHMAN BLAMES OFFICIAL DRY-ROT FOR FREIGHT CONGESTION

By Walter S. Hiatt

Our Special European Correspondent

"The Scandal of Transportation" is the title used by Senator Charles Humbert, editor of *Le Journal* (Paris) in a series of articles severely criticizing the present state of affairs on the railways and water lines of France. Although 17 months of war have passed during which there has been ample time to put the war on a business basis, there is still considerable lacking in the way of efficiency in transporting war munitions, food and other supplies. Senator Humbert had already won the esteem of his countrymen by exposing the faulty organization for the manufacture and supply of war munitions when he turned his attention to an official investigation which had been begun for the purpose of improving ship and car deliveries. This investigation he has continued on his own account in the columns of *Le Journal*.

Senator Humbert has tried in every way to urge upon his country the fact that success in war results rather from material organization than from heroism on the firing line. He has emphasized that the government machinery is cumbersome even under conditions of peace and has not been afraid to point out flaws in the governmental organization that prevent efficiency and hinder well-intentioned and capable civilians who know what must be done but whose hands are tied by the red tape of inefficient governmental authorities.

Never perhaps have the faults of governmental organization in a democracy been more clearly set forth than by Senator Humbert in his campaign to secure better railroad and transportation facilities during the terrible and costly months of this war. In an article entitled "The Fear of Responsibilities," he wrote: "Is all of our public organization bound by some spell which paralyzes devotion and good will and sterilizes the most fruitful projects in the seed? My long experience in administrative, political and governmental affairs leads me to answer: France is dying because of a mortal fear of responsibility. Everybody is trying to protect himself. The employee protects himself against his chief; the chief protects himself against the proposition of the employee. The two ally themselves to protect the service to which they belong. The departments take on special advisers. The ministers, generally ignorant, hesitate between the conclusions of their own staff and that of the directors. When a question is to be decided, each asks to whom it shall be referred. Study it one's self to reach a conclusion? Oh, no! That would be too dangerous. So each devises means to discover whom to consult, and when this person is found, the matter is referred to him. But he too knows the game, and he too takes care to 'play safe.' There is thus a ridiculous tennis game between the bureaus. The game is to know how to send back the ball; so much the worse for him who lets the frightful obligation of taking a decision fall on his side."

This game, known in Washington as that of "passing the

buck" would seem to have been applied to the transportation situation through the work of the countless committees of the Department of Public Works, which in France direct the operations of the railways, the canal boat system, and the docks at the seaports.

After the investigation had been under way for two months, *Le Journal* had published articles showing that the State Railways were buying locomotives and cars abroad, whereas 2,000 Belgian locomotives and many thousand freight cars were standing unused, that 2,000 canal boats, fully manned, representing a tonnage of 60,000 cars, were idle, that the price of freights and of products on the markets was soaring, and that the war munition factories were unable to secure new raw material or to deliver their products. It then published an article denouncing the stupidity of the public officials who had not been able to clear up the situation. Some of the newspapers' attacks were directed against the State Railways.

The article stated in part: "Let us be just and modest. We have obtained a great improvement in words, but have obtained an aggravation of the situation in fact. Commissions were named, investigations were started; but the railway stations were closed, the freight rates increased, and production diminished. We denounced the scandalous tie-up of the docks at Havre. Result: last week this station was closed to the public from Wednesday to Monday morning. The largest port in France opening on the Atlantic to the two Americas has therefore been without communication with the interior of the country for five days. The docks are somewhat cleared, but the packages in transit have piled up on the outside of the gate rather than inside.

"At Saint-Etienne order has been given to limit the output of coal in the mines. The same order was given at Alais. So we continue to need coal in factories, in hospitals and homes. The proper remedy was to transport more; the remedy found was to transport less. We are organizing a famine at the base of production.

"A merchant, Monsieur Robbe, wishing to send from Havre to Dieppe 248 tons of linseed for making oil for the army, went on December 7 to the proper office. He was told to send his freight by sea. He might just as well have been told to use the Metropolitan subway in Paris or an aeroplane service, since there is no regular line of boats between Havre and Dieppe.

"It is certain that if the station at Havre were closed the year around and coal production shut off, there would be no shortage of cars at Havre and that all the coal produced might then be transported.

"These are not isolated examples. All the western part of France is losing its products because of a lack of cars. At Cognac (where a train stood loaded for 15 months) the freight rate was raised and merchants were told: 'Because of this you will ship less.'

"The newspaper, *Le Temps*, having asked the State Railways management for an explanation, received the following note: 'Despite the situation the State system is able to make 10,000 daily car shipments, about 2,000 less than before the war. The delays of which shippers complain are not on the whole of the system for more than a week and a half.'

"These figures are exact and false at the same time. I borrow mine from official sources. In fact, the State Railways does provide 10,000 cars for commerce, instead of 12,000 before the war, but of these 10,000 cars, 3,500 are reserved for the army. There remain 6,500, but of these the major part are used for commercial freights connected with the national defense. There really are left at best 3,000, instead of 12,000, for normal commerce, or 25 per cent instead of the 83 per cent announced.

"It is the same as to the delays. The week and a half average is eight weeks for commercial shipments. It is the same as to repairing the 2,000 locomotives. Twenty have been repaired in five months, or 42 years for the 2,000."

"Wagons embusques" is the name the paper gave the cars

not in use, patterning the title after the name *embusque* given any soldier who tries to hide away from the active war service. The newspaper also found much ground for exposing official incapacity in the customs administration. Scotch steel material urgently needed for war purposes took 14 days from the seaport of Nantes to Paris. Once in Paris, the customs officers declared that the French consul at Glasgow had not properly classed the material and asked \$20,000 duty additional, putting a commission of experts at work to fix the precise duty, a matter which it will decide perhaps by the time the war is over.

I wondered for many months why the canal boats used in peace times were not being used in war time. The boats could be seen tied up on every river and canal in France, with their crews idly smoking their pipes. As a neutral, it was not my business to point out this fact to anybody. *Le Journal* has lately explained the matter. Its representative discovered no less than 2,000 idle between Paris and Rouen, a total of 600,000 tons of carrying capacity going to waste, while coal was selling at \$20 the ton because there was no way to remove it from Rouen, where the ships brought it in from England and then were paid ten to twenty days' demurrage while waiting for cars.

It appears that the canal service had been interrupted since the beginning of the war, that many of the canal boats had been "mobilized" and that nobody had thought to "demobilize" them. *Le Journal* found 44 canal boats in charge of the marine section of the territorial engineering corps, 7 of these boats being tied up at Charenton with their crews—7 boats and 60 men doing nothing. The question was asked: "Has the possibility of using these boats to transport coal, as well as raw war munitions, to the factories at Paris never been considered by the public authorities? There is a Minister of Public Works and under him a direction of the Roads and Navigation with a sub-direction especially charged to look after the operation and use of the rivers and canals. Why does this complete organization wait so long about ordering these boats placed in circulation?"

Since the beginning of the war France has purchased and imported for its army some 150,000 automobiles, many from the United States. A good half of these were heavy trucks. The roads of France in the army zone are fairly lined with them, dozens after dozens of trains of them, running out from Paris or meeting the railroad trains at any given points and there picking up freight. Has there been any waste in this method of transport? *Le Journal* discovered 300 in one place that, having been in need of repairs, were shoved into an uncovered yard and let go to rust and ruin. The soldiers guarding them were occupied in raising chickens, sheep and pigs.

In a previous article I pointed out that war is waste. This article is not intended as a criticism of France or French efforts, for no stranger can do other than admire the struggle that France as a whole has endured. What is going on in France is going on in every country at war. But herein are presented some of the reasons for the ship and car shortages, the transportation tie-up, which has so sorely affected the United States and every country of the world.

LIVERPOOL OVERHEAD RAILWAY.—The ordinary daily service on the Liverpool "Overhead" is 200 trains in each direction, giving an average headway of $5\frac{3}{4}$ minutes, but during the times of heaviest traffic—that is, from 6:30 to 7:30 a. m. and between 5 and 6 p. m.—the interval between trains is only three minutes. In the evenings and on Sundays a 10-minute service is in operation. During the past five years the average number of train-miles run was 845,765. During 1913, the last complete year before the war broke out, when the shipping trade of Liverpool was probably better than it ever had been, the average number of workmen's return (round-trip) tickets booked daily was 6,700, equivalent to 13,400 passengers.

Various Experiences With Safety-First*

The Goggles Bugaboo; Foolhardy Brakeman; a Chastened Officer; Futility of Mere Cunning; Folly of Lying

A CAR REPAIRER'S FEAR OF GOGGLES

By an Assistant Master Mechanic of the Pennsylvania Railroad

An assistant master mechanic, investigating an eye injury, found that car repairman John Good was glad that he did not wear the heavy goggles provided by the company. In fact John became very angry when pressure was brought to bear, and he was required either to wear goggles or give up his good piece-work job. But a little diplomacy in the way of letting John "show himself" changed his mind and he not only ceased to be indignant, but decided that possibly Safety-First methods have some value. It came about in this way:—

Asst. M. M.—Well, John, I hear you have lost some time with a bad eye.

John—Yes, sir. I got a piece of steel in it when I was holding a cutter for Jim.

Asst. M. M.—Why did you not have your goggles on?

John—That's what Jones (the foreman) said; but it's a damn lucky thing that I didn't have them on; they's liable to ruin your eyes.

Asst. M. M.—Why, what do you mean?

John—(angrily)—I ain't going to wear no goggles.

Asst. M. M.—But you know we gave you the goggles to save your eyes; don't you have a pair?

John—Yes, sir, I've got a pair all right. They are over in the locker, where they will do the most good.

Asst. M. M.—But you will have to wear them if you keep on steel work.

John—(heatedly)—There ain't nobody that can make me wear them things. If that piece of steel had hit a pair of glasses my eyes would be full of glass and all cut to pieces.

Asst. M. M.—Oh! You're afraid they may break?

John—Yes, sir; and I aint going to run any risk.

Asst. M. M.—Well, we cannot keep you on steel.

John—All right; but I aint going to run no risk, for you or nobody.

Asst. M. M.—Well, John, suppose the glass will not break?

John—How's that?

Asst. M. M.—We will get a new pair, and you can take a rivet head and break them.

A new pair is procured and John, with quite an air of assurance, takes a rivet head and, grinning at the men who have gathered around, John starts in to show the boss why he "won't run no risk." The first throw misses; the next glances off the lens, and John says, "that there glass is hard to break." He keeps on throwing, more violently each time, and finally with a vicious lick *cracks* the glass, which, though cracked, has not shattered and is still intact. Then he sheepishly admits the facts; "well, mebbe I was wrong; I'd a swore that glass would 'a' flew."

Asst. M. M.—Well, do you think that you will keep on the steel work?

John—Yes, sir; I'll wear them glasses, and I'll bet Bill Johnson wishes he'd knowed what I know about them things.

(Johnson had his eye ball split by a rivet head because he wouldn't risk his eye sight with goggles.)

About a week later John was struck on the nose by a piece of rivet; his nose was not hurt, for the material struck the nose-piece of the goggle, glancing off. It is safe to presume

that John will continue to keep the goggles where they "will [actually] do the most good," hereafter.

A SPECTACULAR STUNT

By R. P. Kyle

El Paso & South Western System

The following dialogue took place between the writer (safety supervisor) and a brakeman, both employed by the same road:

I was making a trip over the line and at a certain station a mixed train picked up a car. The brakeman coupled the air hose while cars were in motion, just before they came together, pulling off a very spectacular stunt, but the most dangerous I have ever seen. Although I was there and was seen by the brakeman, he did not know who I was or that I was an employe of the road. I said nothing just at the time, but got on the train and went in the coach, and when the brakeman came through I asked him if he ever thought of "Safety-First."

He said, "Sure! Heard the one about the old maid and safety-first?" I answered "no" and heard a joke of the usual kind, to which I replied with a limerick of "There once was a girl with a thirst."

Then I said, "But, seriously, when you made that air hose coupling in picking up that car, did you know how dangerous it was?"

"Why, kid," he said, "I have been railroading for thirty years and know how to do it. This safety-first stuff is a joke; you can't railroad with that."

"It is a joke on death for the fellow who uses it," I said. "You know Ben Wright, and how he lost his foot kicking over a coupling; that was no joke."

I then told him who I was and called his attention to the fact that Ben Wright had railroaded 25 years, handling link and pin; knew that he was taking a chance in kicking the coupler and did it once too often. I said, "Some day you may stumble or not get down low enough and have your brains crushed out by the coupler if you continue coupling your hose that way."

The conversation ended here and had been carried on in a light, pleasant way. Today this brakeman is an officer in the trainmen's lodge on his division, attends the safety meetings and is a booster for SAFETY-FIRST.

ADVICE UNSOLICITED BUT THANKFULLY RECEIVED

By a Supervisor of the Pennsylvania Railroad

Standing across a street crossing was a draft of box cars coupled to an engine. Men hurrying to and from work were passing around the end of the last car. Finally one man passed so close to the end that his coat touched the coupler. The yard conductor spied him and yelled, "Hey you, what do you mean by passing so close to the end of the cars, do you want to get killed?" The man looked up, of course. Being one of the officers of the road, he resented the tone of the conductor and replied, "I know what I am doing, I am watching out." "All right," said the conductor, "it's up to you. I suppose you know that you would have a slim chance for your life if those cars should suddenly back up." "Right you are," said the officer; "Safety-First. Thanks"—and he walked away.

This little incident was heard by several persons at the time, and it was quite noticeable thereafter how many gave the cars a good clearance. Some time later, this officer happened to come across the conductor at a Safety-First meeting,

*Articles received in Safety-First Competition. Others were published in the issue of January 28.

and thanked him again for this unasked for advice. It surely was advice unasked for; but it was thankfully received.

PUT YOUR GOOD ADVICE ON PAPER

By Fred. Maletz

Kansas City Southern, Pittsburgh, Kan.

The giving of advice on Safety-First to an individual by approaching him personally is like trying to drown a duck by locking it out in the rain.

I find, in my work as a Safety-First committeeman, that the "other fellow" gets it into his head that you are trying to "bawl him out" and as a consequence an argument ensues which results in sore feelings on the part of those participating in it and accomplishing nothing of real value to any one. I will relate a little incident which happened to myself.

My duties take me through the train yard every morning, and for several days last spring I had noticed a complete draft rigging which had been "lunged" lying loose in the yard; and the idea dawned on me "What would happen if a switchman should stumble over it and fall beneath the moving cars?" So I approached the chief yard master in this manner:

"Say, Charley, don't you think that some of your men might trip on that coupler and get seriously hurt if it is not removed?"

"Say, you," he interrupted, "You go over there and tell your troubles to that fellow"—as he pointed in the direction of the chief car inspector, who stood a short distance away. So, thinking that possibly the inspectors would have more to do with a loose coupler than the yard master, I proceeded to notify the chief inspector; but I did not get to say very much, for he stopped me with this question:

"Where's your button?"

"What button?"

"Your Safety-First button."

"Oh! It's up home."

"Well, whenever you get it on, we will take time to listen to anything you might suggest."

"Does a fellow have to wear a button before he can call the attention of others, to a dangerous condition?" I asked.

"Well, go get your little button and we will listen to you," he added.

So, seeing that if I said anything further, I might make for myself a permanent enemy, I desisted at once. That afternoon I wrote a short but courteous letter to the general chairman of our safety-first committee telling him about the coupler; and the next morning the coupler had disappeared.

The thought that I had tried to impress upon their minds, the danger of leaving obstructions lying between tracks, was brought forcibly to everybody's mind, two weeks later, by an engineman stumbling over an obstruction and having one of his hands cut off.

I believe that the best way to reach the heart of a man in a matter of this kind is to put your thought on paper, so that he may study it over when he goes home; and ten chances to one, he will see it in the light that you present it. The danger of an incipient conflict which usually results from a personal encounter, will thus be entirely eliminated.

THE FOLLY OF LYING

By F. H. Babcock

Pittsburgh & Lake Erie, Pittsburgh, Pa.

Scene—Two car repairmen cutting off rivets from steel car.

Bill to Steve—"There comes the Safety-First man. Get the hose over that rivet, and we'll put on the goggles before he calls us." Steve picks up the hose, which was within reach, goggles are slipped on, hose is held over the rivet head to prevent it from flying, and a very satisfactory demonstration of Safety-First is in evidence.

Safety Agent, approaching.—Hello, boys! I see you've got the right idea of Safety-First.

Bill—(Turning to Steve with a wink.)—Yes; we always do it that way—don't we, Steve?

Steve.—(Hesitatingly.) Yes.

The next morning an examination of the accident reports disclosed the following:

"William ———, while cutting rivets from steel car, was struck above right eye by flying rivet head, causing slight cut on eyelid. Given first aid treatment and returned to work. Was not wearing goggles at the time."

The safety agent investigates the case and the next dialogue is as follows:

S. A.—Good morning, Bill!

Bill.—(Rather embarrassed, with a plaster over his eye, and wearing goggles.) Mornin'.

S. A.—What happened to your eye?

Bill.—Got hit with a rivet head.

S. A.—Did you have the goggles on, and did you hold the hose over the rivet at the time?

Bill.—No.

S. A.—Where were your goggles?

Bill.—In my pocket.

S. A.—Good place to have them. (Bill had nothing more to say.)

S. A.—Now, Bill, didn't you tell me yesterday as you winked your eye to Steve, that you always do your work the safe way, and Steve, hesitatingly, agreed with you?

Bill.—Yes, Mr. Safety Agent, I did say that; and we both lied about it. We thought we were expert enough at the business not to get hurt. It was all my fault, and while the injury was not serious, we both have learned a lesson, and will in the future play the game safe.

S. A.—I'm glad to hear you talk that way. You know the goggles are given you for your protection. They are to wear; not to carry in the pocket, and we expect you to wear them when your eyes are subject to these dangers.

Bill and Steve together.—You bet we will.

S. A.—So long, boys.

Bill and Steve.—So long.

A LIGHT GASOLENE MOTOR CAR FOR PASSENGER SERVICE

By Charles E. Hunt

The Northern Pacific recently has placed in service on its Hartford-Monte Cristo branch in the state of Washington, an all-steel gasolene, combination passenger, mail and baggage car of somewhat unique design. The conditions are espe-



Northern Pacific Branch Line Motor Car

cially severe as grades as high as 3.7 per cent are encountered on this branch. The car was built by the Hofius Steel & Equipment Company of Seattle, Washington, and in the ar-

rangement of the power plant and transmission, closely follows automobile design. It is 31 ft. long by 9 ft. in width; it will seat 30 passengers and will carry 4,000 lb. of baggage, express and mail. The weight in working order is 20,000 lb.

The car is driven by a six-cylinder gasoline motor, developing 125 hp. at its maximum speed. The equipment includes a high tension magneto as well as an electric starting and lighting outfit. The motor is cooled by a large radiator of the automobile type placed in front of the car, an auxiliary water tank being included in the cooling system. The power is transmitted from the motor through a heavy clutch of the automobile type to a gear box arranged to provide for four speeds ahead and four speeds back. The power is transmitted from the gear box to the axle by a longitudinal shaft through bevel gears on the axle which operate in an oil bath.

The rear wheels are 33 in. in diameter of chilled cast iron mounted on four-inch axles with roller bearing journal boxes. The front truck is of the four-wheel, equalized type and is carried on 28-in. chilled cast iron wheels mounted on 3½-in. roller bearing axles.

The car is supplied with both hand and air brakes. The air pump is driven by a chain from the propeller shaft and is fitted with an automatic pressure regulator. The entrance door in the side of the car is arranged so that it may be controlled by the operator, the steps folding up when the door is closed.

RAILWAY RETURNS FOR THE FISCAL YEAR 1915

The Bureau of Railway Economics has issued Bulletin No. 88, giving a summary of the principal railway statistics of Class 1 roads, those having gross earnings of over \$1,000,000, for the fiscal year ending June 30, 1915. This is the first of a series of proposed annual publications which aims to present as soon as possible after the close of the fiscal year significant statistics of the more important railway systems compiled from their annual reports to the Interstate Commerce Commission. The Class 1 roads include approximately 89 per cent of the entire railway mileage of the country, and 97 per cent of the operating revenues. Emphasis is laid, in the introduction to the pamphlet, upon the fact that these figures are in no sense official. They are preliminary and tentative. Also, changes in the statistical and accounting regulations of the commission render it difficult, and in many cases impracticable, to compare the returns for 1915 with corresponding returns for previous years.

An average mileage of 228,330 miles of line is represented in the statistics. The income account, with comparisons for the previous year, is as follows:

INCOME ACCOUNT

Item	Amount 1915	Amount 1914	Increase 1915 over 1914
UNITED STATES			
Railway operating revenues.....	\$2,870,913,815	\$3,029,914,285	*\$159,000,470
Railway operating expenses.....	2,020,823,953	2,202,782,882	*181,958,929
Net operating revenue.....	850,089,862	827,131,403	22,958,459
Railway tax accruals.....	133,219,085	135,730,764	*2,511,679
Uncollectible railway revenues..	649,921	28,381	621,540
Railway operating income.....	716,220,856	691,372,258	24,848,598
Miscellaneous operating income..	1,874,357	1,672,391	201,966
Total operating income.....	718,095,213	693,044,649	25,050,564
Non-operating income†.....	237,368,878	298,171,158	*60,802,280
Gross income.....	955,464,091	991,215,807	*35,751,716
Deductions from gross income:			
Interest on funded debt.....	386,483,143	376,241,333	10,241,810
Interest on unfunded debt.....	28,401,357	31,602,481	*3,201,124
All other deductions†.....	227,589,566	235,677,286	*8,087,720
Total deductions†.....	642,474,066	643,521,100	*1,047,034
Net income.....	312,990,025	347,694,707	*34,704,682
Disposition of net income:			
Dividend appropriations.....	169,563,440	205,914,908	*36,351,468
Income appropriated for investment in physical property...	20,807,042	27,371,949	*6,564,907
Other income appropriations...	12,890,736	12,681,240	209,496
Total appropriations of income.....	203,261,218	245,968,097	*42,706,879
Balance to credit of profit and loss	109,728,807	101,726,610	8,002,197

*Decrease.

†Because of accounting are not strictly comparable.

The total equipment of these lines in service on June 30, included 61,838 steam locomotives, 279 other locomotives, 2,286,596 freight train cars, 2,673 passenger train cars and 93,404 company service cars; 512,144 of the cars were of steel construction, including 501,309 freight cars, 6,014 passenger coaches and 4,821 other passenger cars; 676,270 cars were steel underframe construction.

The total investment in road and equipment to June 30, 1915, was \$13,530,304,444, of which \$322,489,825 represents investment during the year.

Tabulations relating to the compensation of employees are very scanty and incomplete, because of the failure of certain roads to make returns on account of changes in the regulations of the commission. The total number of employees, excluding general and division officers, is reported as 1,260,601, for a total of 197,959 miles, and the total compensation was \$1,110,084,052 for 213,000 miles. The number of general and division officers was 13,380 and their total compensation was \$44,219,510. Excluding officers, the average annual compensation per employee was \$813.17.

The total tonnage of revenue freight carried was 1,683,337,337, and the ton mileage of revenue freight was 273,758,173,613. The number of revenue passengers carried was 935,686,180 and the number of revenue passenger miles, 31,859,712,578.

Some of the principal per mile statistics are shown in the following table:

Item	United States
AVERAGE PER MILE OF LINE:	
Operating revenues.....	\$12,573.49
Operating expenses.....	\$8,850.43
Net operating revenue.....	\$3,723.06
Taxes.....	\$583.45
Operating income.....	\$3,136.77
Freight revenue.....	\$8,660.26
Passenger revenue.....	\$2,755.46
Passenger service train revenue.....	\$3,431.00
Freight train-miles (freight train density).....	2,355
Passenger train-miles (pass. train density).....	2,444
Total revenue train-miles (train density).....	4,930
Total revenue locomotive-miles.....	6,670
Total freight car-miles.....	87,590
Total passenger car-miles.....	14,097
Revenue ton-miles (freight density).....	1,198,955
Revenue passenger-miles (pass. density).....	139,533
AVERAGE PER MILE OF MAIN TRACK:	
Freight revenue.....	\$7,536.95
Passenger revenue.....	\$2,398.05
Passenger service train revenue.....	\$2,985.97
AVERAGE PER TRAIN-MILE:	
Operating revenues.....	\$2.55
Operating expenses.....	\$1.80
Net operating revenue.....	\$0.75
AVERAGE PER FREIGHT TRAIN-MILE:	
Freight revenue.....	\$3.49
Loaded freight car-miles (loaded cars per train).....	24
Empty freight car-miles (empty cars per train).....	12
Total freight car-miles (cars per train).....	36
Revenue ton-miles (tons per train).....	483
AVERAGE PER PASSENGER TRAIN-MILE:	
Passenger revenue.....	\$1.07
Passenger service train revenue.....	\$1.33
Passenger car-miles (cars per train).....	5.7
Revenue passenger-miles (passengers per train).....	54
AVERAGE PER FREIGHT CAR-MILE:	
Revenue ton-miles (tons per loaded car).....	21
Revenue ton-miles (tons per car).....	14
Freight revenue—cents.....	15.32
AVERAGE PER PASSENGER CAR-MILE:	
Revenue passenger-miles (passengers per car).....	15
Passenger revenue—cents.....	29.77
MISCELLANEOUS AVERAGES AND RATIOS:	
Operating ratio (per cent).....	70.39
Average haul per ton—revenue freight—miles*.....	162.63
Average journey per passenger—miles*.....	34.05
Average receipts per ton-mile—cents.....	.722
Average receipts per passenger-mile—cents.....	1.975
Average tractive power per locomotive—pounds.....	31,883
Average capacity per freight car—tons.....	40
Average seating capacity per passenger car—coaches only.....	66

*On the individual railway.

The first table presents the name and operated mileage of the 170 railways covered by the summaries of the bulletin, listed according to districts. The tables next following give the significant statistics for the combined railways of each district and of the United States as a whole.

Government Regulation of Our Railroad Systems*

What the Proposed Congressional Investigation Ought to Accomplish—The Effects of Insufficient Earnings

By Oscar W. Underwood
United States Senator from Alabama

There are many problems that confront the American people today that must be solved justly to all concerned in order that the solution determined upon may be accepted by the country as final. There is no more important question now pending before the American people that awaits proper solution than the settlement along just and economic lines of the vexed problems of transportation. The President of the United States in his recent message to Congress has recommended that a commission should be appointed to give a thorough investigation to all the problems that confront us in the field of transportation.

WHAT PRESIDENT'S RECOMMENDATION MEANS

As I understand the purpose of this investigation, it is not to hold an inquest on what has happened in the past. If errors have been committed or injuries have been done, that is a question for the courts and not a question of legislation. The real purpose to be accomplished by the investigation is to give an opportunity for all concerned—the farmer, the merchant, those directly engaged in transportation, the Interstate Commerce Commission and the railroad managers to appear before a committee of Congress and state their views in reference to the solution of this great problem, with the view in mind that in the counsel of many we shall find wisdom to guide our legislative course.

You may ask me, why the need of an investigation at all? There may be those present who believe that the transportation companies of the United States are engaged in private business and that they should not be interfered with by government regulation. To them I can only say that the transportation of the commerce of this country by the carriers is so closely allied to the healthy growth and the economic business development of the nation that its regulation was inevitable from the beginning.

More than that, revolutions do not move backward, and if we are unable to successfully and fairly regulate the transportation systems of America, the country will demand that we go forward, and the next step ahead is the government ownership of the railroad lines. I think a step in that direction would be most unfortunate. It would lead to many evils that we dream not of today; to avoid which, we must work out a satisfactory system of government regulation, both for those engaged in the shipment of freight, and those who have their money invested in the means of transportation. It is, therefore, a matter of great importance that we should earnestly endeavor to reach a fair and reasonable solution of the problem of regulation at as early a date as possible.

It has been said, a nation is an organism, not unlike a living individual, wherein the channels of transportation are arteries and veins; if the flow in these be sluggish, industrial disorders are indicated; if it be clogged, industrial diseases follow; if it be stopped, national disaster results. Something long has been, is, and will apparently continue to be wrong in the relation between the people and those who are engaged in the transportation business—something so wrong as at times to border on open hostilities. Drastic remedies spasmodically applied—and ill-considered and misapplied laws—have not reached, but have rather more deeply rooted the essential wrong.

In almost all countries the railroad question is one of first

importance and has been met in foreign lands either by government regulation or government ownership. In other countries the problem has not been as difficult of solution as in our own, due primarily to two causes. Our large population and vast natural resources, located far inland and at great distances from water transportation, makes railroad carriage indispensable, and industrial freedom could be guaranteed only by just regulation. The most serious difficulty that has in the past prevented the solution of the problem here, and is not met abroad, is a political one. Our system of government, under which the states possess certain inherent governmental rights, and the federal government the great powers that were delegated to it in the beginning by the states, increases the difficulties and uncertainties that surround the problem before us.

It has been said that "No man can serve two masters," and under the regulation of today the transportation companies of America must obey the mandate of the federal government and at the same time the orders of each state through which the railroad line makes its way. Our courts have held that under the protection of the federal constitution the right of the railroads to charge rates that will produce a reasonable income on invested capital, must be held inviolable, then how can we successfully determine what is a reasonable charge to be allowed for invested capital when you leave the determination to three or more sovereignties, each acting in its individual sphere?

Low rates and adequate facilities are demanded by the public, but the granting of one is often the denial of the other. Adequate facilities very often require the expenditure of large sums of money, but low rates prevent the accumulation of surplus capital and lessen the borrowing power of the roads. Without new railroad facilities our commerce cannot be expanded beyond our present limitation, and trade has met a permanent barrier to its future development.

Two decades ago the great trunk lines of the country were able to borrow, in this country and abroad, the money necessary to increase their facilities at four and four and a half per cent interest. Railroad bonds were considered by the investing public a first-class investment. How is it today? It is often with great difficulty that the best transportation systems in the United States are able to renew their old loans or place new ones. Practically none of these loans can now be placed at 4 per cent interest. A large majority of the bonds or notes sold in the last year earn above five and a half per cent interest, and some are placed at rates as high as seven and seven and a half per cent. What is the effect of this condition on the shipping public? It must be borne in mind that on every dollar that is earned by the transportation companies of America, 88 cents must go to pay wages, upkeep and operating expenses, and only 12 cents goes to the capital account. It must also be borne in mind that there is no speculative enhancement in the value of the railroads that can be converted in the coffers of the company, because the property of the railroad is needed for its operation, and when the lines are once built the operation must continue in the interest of the public, and whatever their relative value may be does not affect the earning capacity of the railroad company.

If you increase the interest rates, the transportation companies must pay. In the end you must get the money to meet the increases either by the reduction of wages, the cur-

*Abstract of an address at the dinner of the American Electric Railway Association and the American Electric Railway Manufacturers' Association at Chicago, Ill., on February 4.

tailment of facilities or by an additional charge on the passengers and shippers of freight.

INCREASE OF RATES MUST COME

Practically speaking, the last alternative is the one we must adopt. Where a transportation company placed its bonds at 4 per cent interest 20 years ago, and renews them today at 6 per cent, so far as the public is concerned, it is identically the same as if the company had increased its bonded indebtedness by one half at the old rate of interest. And yet the public derives no benefit whatever from the increased charge.

It is, therefore, necessary in the solution of the problem before us in the interest of the public, even more so than in the interest of invested capital, that the credit of our transportation companies should be so good that they can secure the capital for their present maintenance and their future development at the lowest possible charge.

There may be many reasons to account for the changed status of railroad securities as investments in recent years. You may say that it is due to adverse legislation that has alarmed the investing public. Whether the legislation has been unwise and ill-considered, or whether it has been just and fair, there can be no question that the investing public has become alarmed as to the solvency of railroad securities. It is also true that recent legislation of Congress exempting state and municipal bonds from national taxation has invited capital into that field of investment. Again it is true that the past generation regarded industrial securities as a more or less speculative investment, but the development of the great industries of our country today along safe and conservative lines has opened a field for the use of capital at higher rates of interest than the transportation companies of America can afford to pay because there is no governmental limitation on the profits that can be made in industry, and there is a hard and fast limitation, fixed by law, on the earning capacity of railroad securities.

The opening of new fields for investment has taken away from the transportation lines much of the market they enjoyed for their securities in the past.

The rates of taxation have increased in every state of the Union. Wages have gone up. The cost of equipment and supplies have greatly increased. If it had not been for economical management, many of the railroads that are running today would have been forced into the hands of receivers.

There is yet another problem that we must consider, and that is the safety of the employees, passengers, and freights that are carried over our transportation lines. Statistics show that there are at least 10 employees killed or injured on American lines to 1 on the railroads of Great Britain. It cannot be truthfully said the engineers who constructed these roads have builded them with less ability than the engineers who constructed the English roads. It cannot be said that our iron and steel, our timber and rock are not as good building material as that which is found in the British Isles. It cannot be said that the men who sit at the throttle, or watch the signal tower, are less capable, sober and alert than the men who occupy similar positions in a foreign land. Then why should we face conditions in this country that endanger human life, and make a serious charge on transportation, that in the end the public must bear, if it is not due to the causes I have named? To my mind it is clear that the dangers involved in our railroad system are almost entirely due to the lack of proper transportation facilities.

We endeavor to run trains over a single track where the needs of business require double tracks. We load our freight on weak and defective cars where new cars should long ago have taken their place. We rely on antiquated methods for the movement of our trains when our tracks should be provided with the latest and best signal devices.

In fact it cannot be denied that to adopt modern methods and provide proper facilities for transportation would be true economy in the end.

THE EFFECT OF INSUFFICIENT EARNINGS

Then why has it not been done? Largely because the transportation companies of America have been unable to earn sufficient capital to enable them to meet their operating expenses, interest charges and accumulate a surplus with which to provide for betterments and improved facilities, and that their credit has been so seriously disturbed that they are unable to borrow money for the new improvements at reasonable rates of interest.

In fact I think it can be said without expectation of contradiction that taken as a whole the transportation system of the United States, so far as performing its proper functions in the transportation of our freight to their ultimate markets and the carriage of passengers to their destination with safety and economy, is breaking down.

What then must we do to solve the problem? To restore confidence in the minds of the investing public as to railroad securities? To insure rapid transportation of passengers and freights to their ultimate destination at reasonable rates, and to provide for the safety of transportation and the increased facilities that are necessary to transport the growing business of the nation? These results cannot be accomplished by moving backward or divorcing our transportation system from government control. Nor can it be accomplished without great danger and great cost to the people by progressing to the ultimate step in advance and accepting government ownership of the transportation lines.

In my judgment, we must find the golden mean. We must solve the problem along lines of private ownership and government regulation. We must consider the wisdom of substituting one master for the 49 masters that regulate our commerce today. We must consider the wisdom of government supervision of the issuance of all securities by our transportation companies with the assurance to the public that new capital will be invested to secure proper facilities and used for legitimate purposes—not for speculation. We must assure the public that when they invest money in railroad securities which are supervised by government regulation, we stand for a system of regulation which will allow the transportation companies to charge such rates for carriage as will enable them to promptly meet their interest account, as well as their operating expenses. We must perfect a system of regulation that will recognize that the transportation lines of America are great public highways in which the people are as much interested as those who have invested their capital in them; that every shipper in America must have equal rights in the transportation of his goods along those highways; that rebates and discriminations of all kinds must be of the past and prohibited in the future, and we must recognize that the man who is willing to invest his money at a moderate rate of interest in railroad securities is not exploiting the public, but is a public benefactor.

WHAT ADEQUATE TRANSPORTATION MEANS

In my opinion an adequate transportation system means:

1. Roadbeds must be made more secure and more permanent.
2. Trackage must be enormously increased and many roads double tracked.
3. Safe equipment must be sufficient to satisfy requirements at any and all times.
4. Terminal facilities must be greatly improved and largely increased.

Stated briefly, then, our question is, whether the American people are willing to put up with an unsafe, inferior, and inadequate transportation system, or have the intelligence to pay for one that will supply their needs and protect the lives of the people.

The main trouble with the regulation of our railway system is that corporate law has been destructive, not constructive, has been piecemeal, not comprehensive.

To solve these problems, it is proposed that a committee

of Congress shall give a thorough and complete hearing to all who desire to present their views. Let us hope that the result of the investigation will be productive of wise legislation—legislation that will build up and not destroy—legislation that will be helpful and not hurtful—legislation that will bring lasting and complete prosperity to the people of America.

SOME AIR BRAKE HISTORY*

By H. C. Woodbridge

Assistant to the General Manager of the Buffalo, Rochester & Pittsburgh

Our monthly staff meeting over, a self-appointed sub-committee repaired to the city and stowed away in an exclusive section of the Statler Hotel, where the shortcomings of each of us (and others) might be discussed without regard for the rules of official etiquette or diplomacy. Suitable aids to sociability being furnished, we sat a space in relaxation; then R. D., the general manager's special representative, remarked, "We ought to cut loose from old impressions and deal with the new cards; let up on speed restrictions, that were imposed when air brake equipment was in its swaddling clothes, and thus avoid overtime and discount our competitors." Whereupon P. F., superintendent of the Southern divisions, at once on the defensive, mumbled, "Air brakes in swaddling clothes! I wish we'd had air brakes with or without any clothes back in '83. It was June 30, . . . that old man Horan, on engine 35, pulling the mixed train, stopped for water at Rasselas; the slack ran in as the stop was made and a pin hopped out of place, letting the coach and seven cars start back down that one per cent grade. The train crew and thirteen passengers were asleep and . . . well, they hit extra 34, and my old friend, Conductor Toles, his flagman, and five passengers were killed.

"That's but a sample," said J. G. (road foreman). "You all remember what happened May 6, 1895, when fourteen non-air cars, loaded with ore, broke off Wilson's train near West Valley; that 89 ft. grade did the rest. . . .

"Of course," chimed in M. G., superintendent of the North divisions, "there is none of that raw stuff now. The installation of the automatic triple valve put the cleaner on that; but, even with the air, it's well to go slow down the big hills. 'Twas just the other day comparatively—January 12, 1907—that Otto Egger on the 253, with 53 loads, ran away down Gainesville Hill, struck engine 131 and 257 on train 29 at Silver Lake Junction; 40 cars and three locomotives converted into scrap iron in two or three seconds. . . .

R. D. couldn't stand that and sneered, "Oh, tommy rot, Mac, come out of it. That was caused by a turned angle cock and would have been avoided but for the non-air cars and the flagman being too green to reach the rear angle cock. Now, we have self-locking angle cocks, solid-air trains, conductor's valves, and brake-pipe pressure gages in all cabooses, and besides, with the cross compound pumps, E. T. locomotive equipment, and type K triple valves on the cars, we never lack for pressure or flexibility of control. What more do you want? Turn them loose and save our share of Brandeis' million a day."

"Sure," said A. B. (assistant superintendent). "R. D. has the dope. In January, 1908, Jim Davis lost his brake pipe at that same place; but Conductor Webster heard him squeal for brakes as the train attained undue speed, and he simply wound them up by using his valve, while sitting in the caboose, and not even the train despatcher knew that anything had gone wrong. And think of what Conductor Repine pulled off on the night of October 9, 1908. Repine was in the cupola of his caboose going south on the old single-track line,

before Empire Tunnel and the double track were completed. An operator had failed to hold the block on Northbound No. 2, and everything was lined up for a smash; but Repine saw the reflection of the flyer's electric headlight on the hill as they approached that long curve; he just put it all on from his seat in the cupola, and No. 2 saw them in time to stop."

"We ought to have had a stenographer here," said H. P. "This stuff would do for the story that the Westinghouse people want."

"I thought of that," prompted G. W. (assistant superintendent); but they want cash comparisons; what can you do with that proposition? It is true that if it wasn't for the air brake, we would all be 'shacks.' Why, we couldn't begin to handle the heavy trains of today without the present brake equipment. If we tried to maintain the present passenger or freight train schedules without the air brakes, the hazard of travel on land would be greater than that of aviation. Close up and let's go to bed. Any effort to outline the value to the railroads and the public of this marvelous means for train control appears to me to be as futile as an attempt to illustrate or calculate the value of the sun's rays."

"Oh, I don't know about that," said J. G. "Along in the 80's it wasn't safe to handle a train of more than twenty-two cars of fifteen tons' capacity down West Valley. We got enterprising once and tried a double-header with forty-four of those small cars, in charge of a conductor and four good brakemen, each of whom could use a brake club as well as anyone. But that bunch was too much for us, and the two engines, as well as most of the cars, left the right-of-way at Hoyts. But during the past eight years we have handled, regularly, trains of sixty-five battleships, each carrying fifty tons of coal, down that hill, without the aid of hand brakes, and without a single accident. It wouldn't take much of a clerk to make figures from that."

"That's good," said R. D., "but I want the last word. I'm grateful for the developments, not only because they have changed the game from croquet to chess, but because a number of my close friends, iron as well as human, greet me with a smile, who, but for the present-day safeguards would be only pleasant memories set in pain. And to get right home, it's a safe bet that every one of us would now be numbered among the silent majority but for the air brake. Not four months ago I was riding with Frank Hake down the fast track, south of Ashford, when a farmer tried to hurry his sleighload of logs over a bare crossing in front of us. The harness broke as the sleigh covered our tracks; but the Dutchman instantly opened the big hole; and the L triples, with the supplementaries cut in, did the trick.

"It's not pleasant to think what that pile of maples might have done to us.

"Let's bow in thankful reverence before the tomb of George Westinghouse."

And in our hearts we did.

THE INDO-CEYLON CONNECTION.—The new route developed by the South Indian Company between India and Ceylon via Dhanesh-Kodi and Talemanaar, which was opened for traffic in March, 1914, is in an unsatisfactory condition. The management of the Ceylon Government railway has refused to allow freight traffic to be carried, on the plea of an insufficiency of cars. When the route between Tuticorin and Colombo was closed in September, 1914, by the withdrawal of the British India Steam Navigation Company's steamers for government service, the new route was opened for freight traffic, but then only for traffic to and from Colombo, and even to Colombo only in limited quantities. More recently, in consequence of an outbreak of cholera at Dhanesh-Kodi, the traffic has been further limited by restrictions maintained long after the outbreak was over. In other directions the action of the Ceylon government railway authorities has imposed conditions on the steamer service which are not calculated to lead to a healthy development of the route.

*This article, under the title of "Deliberations of the Sub-Committee," was awarded a prize of \$500 offered, in a competition, by the Westinghouse Air Brake Company; and is here reprinted, slightly abridged, from the February number of the B. R. & P. Employees' Magazine.

Methods of Producing Sound Steel Ingots

A Description of the Obstacles Encountered and Several Processes Successfully Used to Overcome Them

No phase of rail manufacture has received more attention in recent years than the efforts to produce sound ingots, and encouraging progress is being made. A brief abstract is given below of a paper by E. F. Kenney, which is an exposition of the difficulties encountered in the production of ingots and the principal methods used to overcome them. It includes also an account of the method which he has advocated and used successfully. This is followed by an exposition of the method originated and used extensively by Sir Robert Hadfield. A brief account is also given of a paper by Emile Gathmann, which describes a method which he has devised.

MAKING SOUND STEEL COMMERCIALLY*

Piping and blow holes are necessary evils, and one or the other will normally be present in a mass of solidified steel for the reason that the steel when solid occupies a smaller volume than when it was molten. As a mass of steel solidifies from the outside this solidification of the outer steel determines approximately the shape and size of the mass. The molten interior continues to shrink as it cools, and unless the deficiency is taken up by bubbles of gas (blow holes) forming in the interior, there will be a shrinkage cavity known as a pipe. Blow holes are bubbles of gas which were enmeshed in the solidifying metal, before they could release themselves and rise to the top. The refining of steel as carried on in the Bessemer or open hearth processes is an oxidizing operation, and there is of necessity a considerable amount of oxygen present in the bath of metal, mostly combined with iron. There is also present an appreciable amount of carbon, and a combination of the two elements produces gaseous compounds. This reaction takes place in all steels which have not been thoroughly deoxidized, and therefore all such steels contain gas bubbles or blow holes.

In crystallization from most solutions there is a selective freezing of the various substances in the order of their temperatures of solidification and steel follows the general rule. Of the elements ordinarily present in steel, manganese segregates only to a slight degree, while sulphur, phosphorus and carbon segregate markedly. As the presence of some of these elements affects vitally the strength and ductility of the steel the segregated portions are generally harder and less ductile than those not segregated, and this difference in physical qualities prevents the best results in resisting stresses produced in the steel in service.

The general characteristics of segregation are fairly well known, though some of the causes are not so clearly understood, but the following statements will probably not be disputed:

- 1.—Segregation is greatest in the portion of the ingot which freezes last.
- 2.—It is most marked in elements whose characteristics differ most widely from those of iron.
- 3.—It is increased in steel which is lively, and decreased in steel which lies dead.
- 4.—It is greater in steel teemed at high temperatures than in steel teemed at more moderate heats.

The widely prevalent knowledge of the first of these statements has resulted in the application of cropping as the remedy, and there is little doubt that if we could be certain of knowing that there was steady progressive freezing by which the segregated metal was brought to some certain parts of the ingot, we could get rid of the segregation in this way.

Unfortunately, the type of ingot mostly used is so shaped that it is by no means certain that all the segregation occurs at the top of the ingot.

The minimizing of the tendency toward segregation can be effected in two ways—thermally and chemically, the latter being much more effective than the former, but the combination of the two producing the best results. The thermal remedy is teeming the steel at a temperature just high enough to insure clean pouring and avoiding excessive skull in the ladle, and danger of freezing up the nozzle. This lessens the range of temperature through which the steel must cool before solidifying, and also lessens the differential of temperature between the various parts of the ingot in cooling.

The chemical remedy is simply deoxidation; removing the principal source of the production of gas bubbles. Any substance having a strong affinity for oxygen at high temperatures, and whose oxide is not gaseous, could be used, but that which produces an oxide capable of being slagged off and separated by gravitation would be preferred. The elements generally used for this purpose are silicon, aluminum and titanium.

Care in making and pouring the steel and thorough deoxidation can be depended on to minimize segregation, but in carrying out these remedies we have introduced an element which is just as objectionable. This is the internal shrinkage cavity or "pipe."

While various types of special ingots are used for special work, probably 98 per cent of the steel made in the United States today is cast into ingots of one general shape. These ingots have a taper of about $\frac{1}{4}$ in. to $\frac{1}{2}$ in. per foot of length, the top being materially smaller in section than the base. The ingot mold walls are made heavy to absorb the heat from the ingot quickly and cause it to freeze rapidly, and the solidification proceeds with fair uniformity over the part of the exterior of the ingot which is in contact with the heavy metal walls. If the cooling were absolutely uniform, the last metal to freeze would be toward the bottom where the ingot has the maximum section, but the lesser density of the hotter metal causes it to rise, and too frequently the taper interferes with the tendency of the hottest metal to seek the top to such an extent that the freezing metal bridges from one side to the other. The pool of molten metal below such a bridge acts as a center of shrinkage and segregation.

Unfortunately, this is not an infrequent occurrence; the tendency is always present in an ingot which tapers toward the top, and even where actual piping does not develop there is frequently present a loose spongy structure.

The inverted ingot is highly efficient in preventing the occurrence of irregularly located pipes and segregated areas. In that type of ingot, the solidification is always progressive from the bottom upwards; the last metal to freeze is always at the upper portion of the ingot, and bridging is practically eliminated. Consequently, when we crop off all the piped portion from the top we can feel assured that we have left only solid steel.

To avoid a heavy discard there must be provided some method of keeping a small body of metal at the top of the ingot fluid until all the lower portion has solidified. For this purpose many expedients have been suggested, which are of two general classes: (1) Means for adding heat, and (2), means for conserving the heat already in the molten steel.

PROCESS ADVOCATED BY MR. KENNEY

The writer has been experimenting for some years in the effort to develop some practical means of applying the bene-

*Abstracted from a paper presented before the American Iron and Steel Institute by Edward F. Kenney, metallurgical engineer, Cambria Steel Co., Johnstown, Pa.

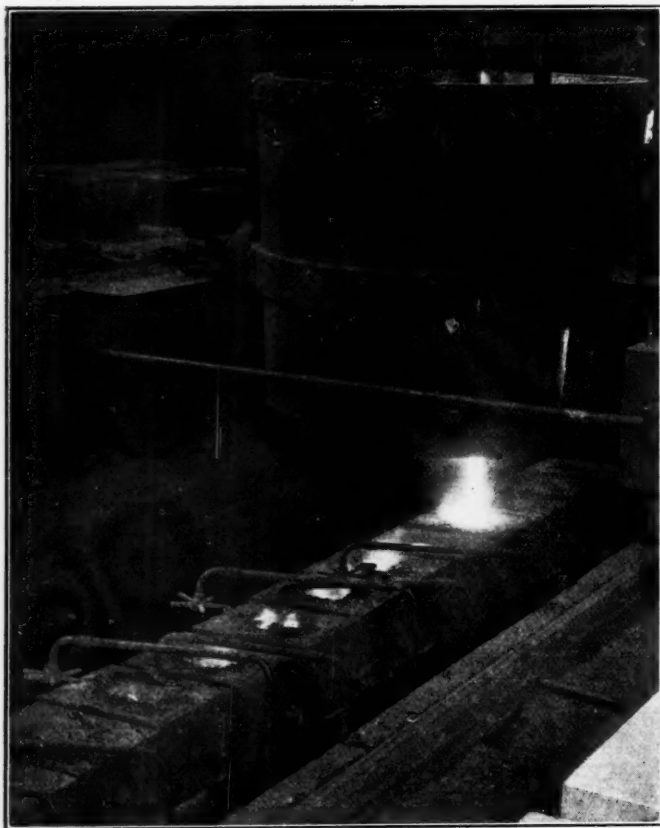
fits of the sink-head to the ordinary methods of steelmaking in commercial use. The principal essentials seem to be: (1) That the ingot be carried through the heating and rolling operations without the necessity of becoming cold; and (2) that sink-heads be of such type that ingots of varying weights can be cast from the same ingot molds.

The practice used in connection with these sink-heads is as follows: A wooden form of the dimensions of the sink-head extension desired is placed inside the metal sink-head casing, leaving a space $2\frac{1}{4}$ in. wide between the form and the casting. This space is filled with moist loam, well rammed.

The loam and casing are then dried, the drying requiring about two or three hours in a pit oven. A number of wooden pegs around the bottom of the casing prevent the loam lining from slipping from the casing while the whole is being handled and set on the ingot molds, and the steel is poured in the usual manner. When the metal reaches the sink-head, the wooden pegs are burned off, releasing the iron casing, so that it can be removed, leaving the loam lining attached to and protecting the sink-head against heat loss. The iron castings do not leave the open hearth, being promptly removed and re-rammed with fresh loam. The loam lining remains on the ingot until it is rolled, which insures against trouble which would result from delays in charging after the protective covering was removed, or the necessity of banking

of solid steel from the ingot will be materially reduced unless we can regulate the size of the ingot to produce the amount of metal needed. In ordinary practice today this is easily accomplished by pouring the steel to any desired height in the molds. For instance, in most works producing rails, a single size of ingot mold is used, and ingots to produce economically any weight of rails are cast in the same mold. Practically all sink-heads used in the past have been so designed that they were set at the top of the ingot mold, and no variation in the weight of the ingot was possible with a given mold.

This adjustable feature has been tried out in connection with the dried loam sink-heads, and is quite practicable. Several thousand tons of rail ingots have been cast with sink-heads which embodied this feature, the ingots being cast 7 in.

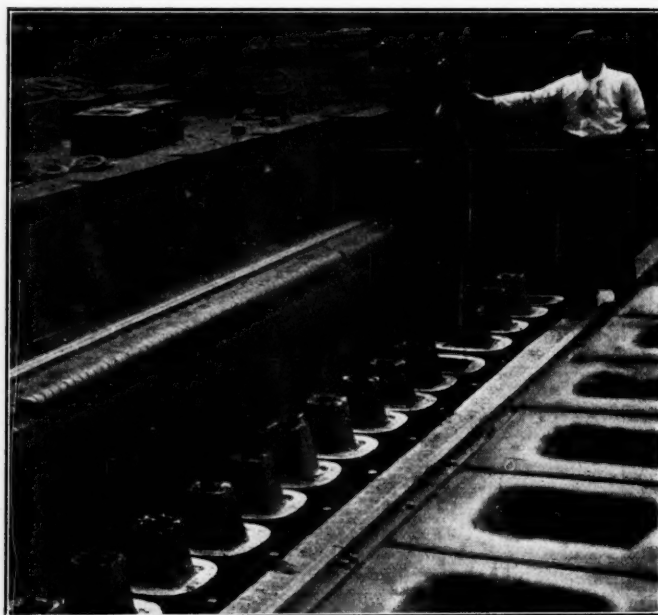


Teeming Ingots with the Hadfield Sink-Head

steel, or any of the many possibilities of commercial steel works practice, which interfere with the regular routine. In practice, this type of sink-head, besides being more efficient thermally, has been found much cheaper than the regulation brick, and, as stated above, has possibilities which make it much more applicable to ordinary steel works practice.

Inverted ingots with sink-heads permit a considerably greater economy because of the much smaller percentage of metal which has to be cropped from the top as compared with the cropping which is necessary with the ordinary ingot.

The value of the sink-head in getting a large percentage



Hadfield Process Ingots with the Sink-Head Removed

shorter than the molds, thereby making a very considerable saving in the scrap loss.

An example of the possibilities in the making of uniform steel in a commercial way is available in the recent rollings of rails for the Pennsylvania Railroad. Out of an experimental rolling of 5,000 tons of rails made from sink-head ingots, we found only one case where the segregation was sufficient to cause rejection, and we have reason to think this was due to an error in not following instructions, and not to anything inherent in the method of producing uniform steel.

These experimental rollings of rails have been selected to show the possibilities of the inverted ingot, because the testing was so thorough and so well checked by the purchaser that there can be no question as to the results.

THE HADFIELD PROCESS

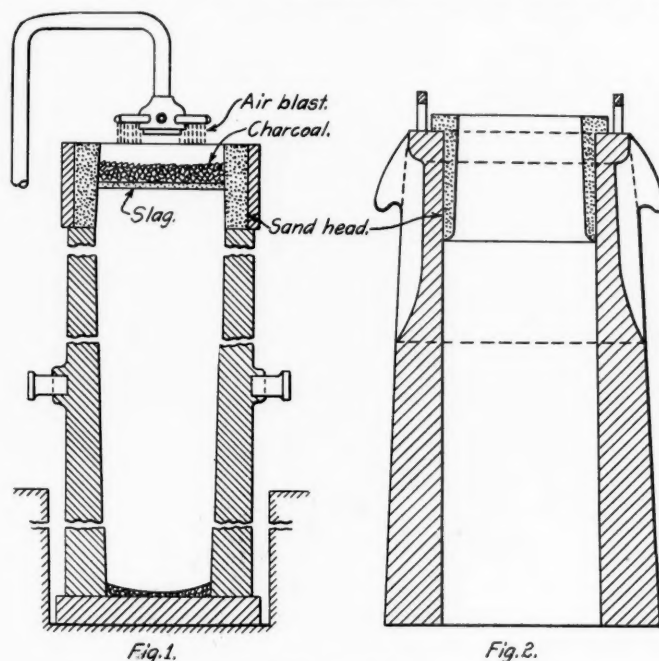
This process implies the use of a "piping" steel, the more rapid cooling of the bottom of the ingot than the top, and provisions for maintaining the temperature of the "head" to feed or supply the body of the ingot with additional liquid metal to fill up the voids resulting from the contraction coincident with cooling. The second condition is fulfilled by casting the ingot with the large end up, though this is not an absolute essential of the Hadfield process. The third provision is secured as shown in Fig. 1. The top of the ingot mold is equipped with a separate section having a sand lining or inner shell. The process is described by Sir Robert Hadfield as follows:

"This method consists in heating the fluid steel in the upper part of the ingot or other mold and maintaining it in a

liquid condition by the combustion, in contact herewith . . . during the cooling and shrinkage of the metal in the lower part of the mold, or solid fuel—for example charcoal—by means of a blast of compressed air which is caused to impinge on the fuel while this is . . . supported by the metal below and the interposition of a layer of fusible material, such as cupola slag, which has little or no injurious action on the metal, between the metal and the fuel. This slag, which may be termed an insulator, largely prevents radiation of heat, the loss by which is much greater than ordinarily supposed to be the case."

The air blast is supplied as shown in one of the accompanying photographs. An air pipe is provided for each ingot, terminating in a perforated head located directly over the top of each ingot so that streams of air are directed against the burning charcoal. In some cases the air is supplied by individual motor-fan sets secured to the under side of each ingot truck, power being supplied by overhead or underground trolleys. Another plan is to provide a continuous grid of perforated pipes under which the ingot must pass on the way from the ladle to the stripper.

At present the sand heads are made by hand. One man makes about 20 in a seven-hour period. Each head lasts



Two Types of Sink-Heads for Ingot Molds

about six heats, so that the cost of the heads is between \$0.20 and \$0.30 per ton of steel. It is believed that machine molding of the heads will materially reduce this cost.

The appearance of the top ingot after cooling is shown in one of the photographs. Due to the "feeding" action a large part of the metal originally in the sand head has been carried down into the body, thus producing a considerable cavity in the top. By filling these hollows with water and then measuring the water, it has been possible to determine the volume of metal which was fed into the ingot. This was found to vary from 3.57 to 4.52 per cent of the volume of the ingot. This phenomenon is one of the advantages claimed for the process. The presence of a characteristic depression of normal size in the top of the ingot is considered proof that the metal is free from either blow holes or piping.

Numerous tests have been made to compare ingots of the same heat with and without the sink-head, with results strongly in favor of the Hadfield process. Longitudinal sections through the ingots disclosed sound metal free from sponginess or piping within a very short distance from the tops of the heads. In consequence discards of only 7 to 10

per cent were required to remove all unsound metal. On the other hand, in ingots made simultaneously by the ordinary process, the piping extends from $\frac{1}{3}$ to $\frac{1}{2}$ of the depth. The results in the improved ingots are also very favorable as to segregation, of which there is little evidence outside of the limits of the small discard required to remove unsound metal. The explanation offered for this is that the continuous supply of liquid metal maintains the ferrostatic pressure throughout the height of the ingot during the cooling process.

The use of the Hadfield process has been limited almost entirely to England, about 40,000 tons of steel having been produced by this method up to January 1, 1915. However, it is receiving considerable notice in this country at the present time, one railroad having ordered 100 tons of ingots for study and experimental use and a series of tests of this material has been made by the United States Bureau of Standards.

THE GATHMANN INGOT MOLD*

An ingot with its larger horizontal cross sectional area at the top is the best shape for obtaining the important "lag" in solidification of the steel. Nearly all of our large mills are, however, so equipped for handling and stripping the ingots that it is practically impossible to do this without extensive changes in equipment.

It is, therefore, necessary to employ means in ordinary big-end-down ingots to accelerate the freezing and solidifying of the lower and middle portions of the ingot and thus provide liquid metal to compensate for the decrease in volume caused by the contraction during solidification of the ingot. This has been accomplished by giving the lower 70 to 80 per cent of the metallic mold in which the ingot is cast a much greater degree of heat absorptive capacity than the upper 30 or 20 per cent.

To insure an ample supply of liquid steel to compensate for the shrinkage in the upper portion of the ingot in very dense, quick-setting steel, it has been found advisable to use walls of a material of poor heat conductivity in the uppermost portion of the mold to supplement the differential effect obtained by the combination of the heavy and thin mold walls by providing a sink-head.

Fig. 2 shows a method of suspending the sink-head freely within the mold cavity. This type of sink-head, in conjunction with the heavy-wall mold, has given excellent results, and is in regular use by several large high-quality steel works in this country. If properly designed, such a mold will produce a sound, homogeneous ingot with about 20 per cent top crop, which is about 15 per cent less than is usually necessary in ingots of like grade of steel made in the old-type mold. Designs of molds have been made and established in actual practice for from 1 to 10-ton ingots.

WAGE DEMANDS AND POLITICS

By W. L. Stoddard

WASHINGTON, February 10, 1916.

Gradually the fact is percolating into the official mind of Washington that the railroad question is not settled, and that in its most acute form it will soon again be before the country and the government for consideration, if not for action. This week marks the firing of the first gun by the four railroad brotherhoods in their request—soon to be a demand—for an eight-hour day and time and a half for overtime. There was also renewed activity in the House Interstate and Foreign Commerce Committee in the matter of the Rayburn railroad securities bill. Meanwhile a senate committee began hearings on Louis D. Brandeis, nominee for the Supreme Court.

Politically also, the situation has highly interesting possi-

*From a paper presented at the meeting of the American Institute of Mining Engineers at San Francisco, September, 1915, the author being manager of the Gathmann Engineering Company, Baltimore, Md.

bilities. A double campaign is about to be launched—the Presidential campaign and the congressional campaign. According to the reckoning of some politicians here the eight-hour movement will come to a head not long after the national conventions in June, but will be before the elections. In the event that mediation should fail and that the two sides should be unable to agree to arbitrate, the next most likely step would be some sort of interference on the part of the President himself. This interference might take the form of calling to the White House a number of representatives of the two sides so as to determine whether mediation from this source might or might not result in either a settlement or a truce; or it might take the form of a special strike commission, similar to that appointed by President Roosevelt in the big anthracite controversy.

Whatever may be the exact course of events, however, it is fairly plain to political forecasters—a numerous and industrious tribe in this town—that the eight-hour movement will be likely to enter into national politics before many months go by. The Republicans would be likely to use the threat of a strike as an argument that the Democrats have created industrial unrest by maladministration, and the Democrats would very likely attempt to show, by endeavoring to avert the strike, that to them should be given credit for handling a delicate and dangerous business with skill and impartiality.

Moreover, while in their first official statement, the men emphasize that they are demanding primarily shorter hours instead of higher wages, nevertheless it cannot be gainsaid that the granting of an eight-hour day would mean a wage increase. Inasmuch as a wage increase would be made ground for a rate increase, the whole thing comes back to the Interstate Commerce Commission, whose decision in the five per cent rate case has already been used as a political argument against the present Administration. Present indications, then, are that even as Mr. Wilson came into office with the railroad situation acute, so in all likelihood he will conclude his first term with the same question, phrased a little differently, as acute as ever.

INVESTIGATING CONCEALED LOSSES

The Freight Claim Association, acting on a report made by a conference committee appointed at the last meeting, and which has conferred with representatives of a number of industrial traffic organizations, and has had the advice of a representative of the Interstate Commerce Commission, will recommend a standard form to be used in sending inquiries to parties presenting claims for losses from packages of freight which have been delivered in apparent good order; and the blank bears a list of 14 questions with spaces for replies. These questions are as follows:

1. On what date was the shipment delivered to truckman at shipping point?
2. Was delivery to the carrier by your own truck? If not give name of trucking company. Give name of driver.
3. On what date was the shipment delivered by the truckman to consignee?
4. On what date was the shortage discovered?
5. By whom was shortage discovered? In what capacity employed?
6. On what date was carrier notified of the shortage?
7. Was the delivering carrier given an opportunity to examine the shipment at the time the shortage was discovered? If so, who was notified to make such inspection?
8. Was the container packed to its full capacity with the property shipped?
9. If not how were the vacant spaces filled?
10. What, if any, disturbance of wrappers or cartons or disorderly condition of remainder of the contents of package indicated shortage?
11. Could the missing articles have been abstracted without disturbing the other goods, cartons or wrappings?
12. Was a careful examination made of the container from which the shortage occurred to discover if it showed evidence of having been previously opened?
13. Why do you consider that the shortage occurred

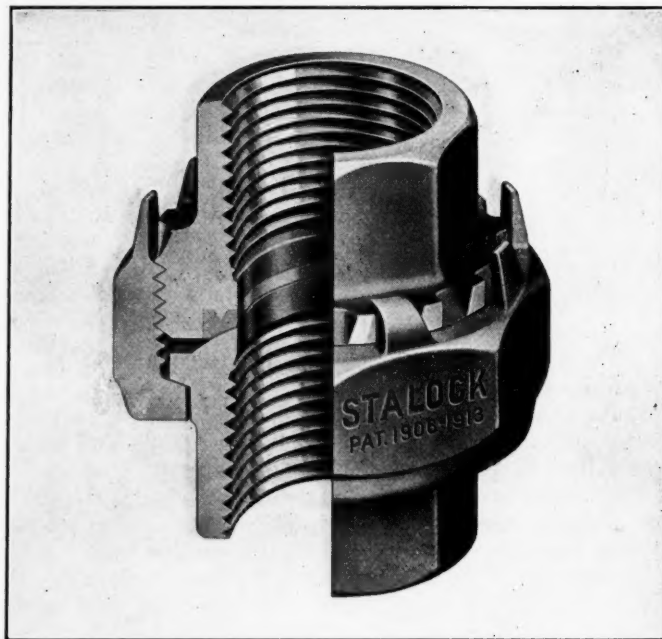
during transportation rather than to error in packing or unpacking, or while the property was in possession of truckman or others?

14. If the question of shortage has been the subject of correspondence between shipper and consignee, please submit it for examination and return.

A standard form is also recommended for use in sending inquiries to the agent at destination. This blank calls for the usual information, and, in addition, asks: Have you any reason to believe that the shortage did not occur while in possession of the carrier? Give date shipment was received; date shipment was delivered; date consignee reported shortage, and date and by whom inspection was made. If inspection was made, state whether package or its contents bore any indication of pilferage. State whether the package was sealed, corded, strapped or otherwise protected against abstraction of contents. Give seal record of car. Were seals broken immediately prior to unloading car? Furnish a full copy of way-bill showing all transfers and exceptions thereon. State any additional facts concerning claim or opinion of its merits.

LOCKING PIPE UNION

A pipe union of unusual construction has recently been developed by the Standard Union Company, 612 Winthrop building, Boston, Mass. The features of the device are clearly set forth in the illustration, which shows a section of the seat exposed. The union has a ground ball joint, the concave seat being formed in a brass seat ring which is interlocked in position. It thus involves the best modern practice of a brass to iron contact to prevent corrosion. On the upper face of the nut, which is of malleable iron, are cast a number of lugs. The upper body of the union is cast with a number of notches or recesses in the shoulder just above the threads. The shoulder on one side of these depressions is square and the



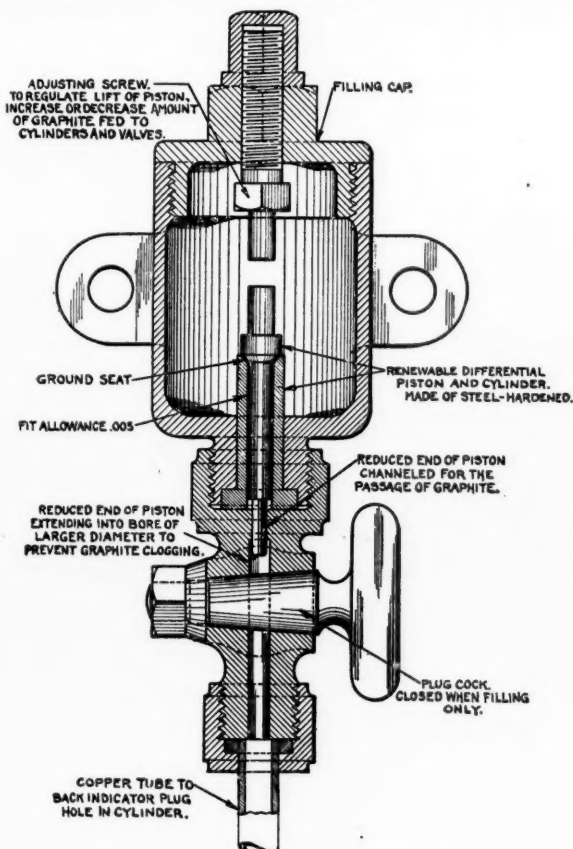
The Stalock Union

other is sloping. To lock the nut one of the lugs is bent into one of the recesses by a blow from a wrench or hammer, at least two diametrically opposite lugs always being in position to be locked. The square shoulder of the recess prevents the thread from slacking back, but should it be necessary to further tighten the union it may be done without difficulty, as the sloping shoulder of the recess will force the lug out of engagement when the wrench is applied. This union is known as the "Stalock," and has been developed especially to meet the severe requirements of railroad work.

GRAPHITE LUBRICATOR FOR LOCOMOTIVE CYLINDERS

A simple device has recently been developed for introducing flake graphite into locomotive cylinders which is entirely self-contained, no motion derived from moving parts of the engine being required. The lubricator was developed and has been patented by E. H. Sweeley, Richmond Hill, N. Y. It is made in the form of a cup arranged for attachment to any convenient part of the locomotive, which contains the graphite. This is connected by a short tube to one of the indicator plug holes in the cylinder. The device is usually attached to some point on the cylinder casting by means of the bolting lugs shown in the drawing.

The graphite cup contains a small cylinder within which works a differential piston operated by the pressure variations in the locomotive cylinder. The graphite is thus worked into



Automatic Graphite Lubricator

the small copper pipe connection and thence into the cylinder. The amount is determined by the stroke of the differential piston, the filling cap containing an adjusting screw by which the stroke is regulated. A plug cock is placed below the graphite cup to close the cylinder connection when filling the cup.

After the cup has been in operation on a locomotive for a few hours, the valve and piston rods are said to show indications of the graphite lubrication, a deposit being left on them which is visible from the outside. The graphite is carried by exhaust steam into the valve chambers, thus effectively lubricating both the cylinders and the valve chambers. The device is applied without in any way disturbing or altering the existing method of oil lubrication. It merely supplements the oil lubrication. Large quantities of graphite are neither required nor desirable, the best results being obtained by the regular application of small quantities. Tests indicate that one-half ounce fed into each cylinder of an ordinary locomotive for each 100 miles run is sufficient. With this device it is claimed that the amount of graphite used may be very

closely regulated and that no objectionable accumulation of graphite on the pistons, cylinder heads or in the steam ports follows its use.

The lubricator has been in service on a number of locomotives, some of which were equipped with superheaters and, in some instances, were operating at temperatures as high as 720 deg. to 740 deg. F. Under these severe conditions no trouble has been experienced with the lubrication. In a comparative test conducted over a period of about one year, a locomotive equipped with the graphite cup ran 56,000 miles with a total average cylinder wear of .014 inch as against a mileage of 48,000 with a total average cylinder wear of .056 inch for a locomotive not so equipped. The average packing ring wear in the locomotive lubricated with graphite was only 1/32 in., while the other locomotive received two new sets of rings during the test. The graphite used cost less than one cent per 100 miles, and the estimated saving based on cylinder and ring wear alone, was approximately \$40. Because of the reduced friction, there was also claimed to be an appreciable saving in fuel consumption.

UNIVERSAL CAR DOOR FASTENERS

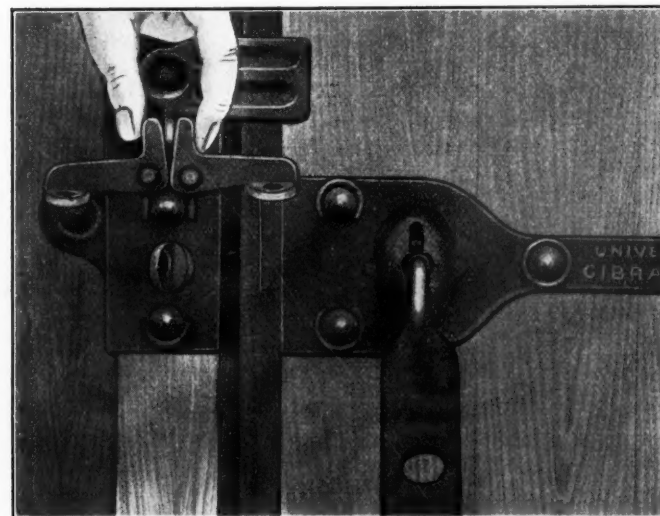
Two box car door fasteners are illustrated herewith which have been designed to meet all M. C. B. requirements as to construction and which are burglar-proof. Both are adapted to the use of any type of car seal and may be fastened with a



The Universal Simplex Fastener

padlock with equal facility. These fasteners are made by the Universal Car Seal & Appliance Company, Albany, N. Y., and are adapted to either steel or wood car construction.

The metal door stop of the "Universal Gibraltar" fastener carries two gravity pawls which swing down against the hasp



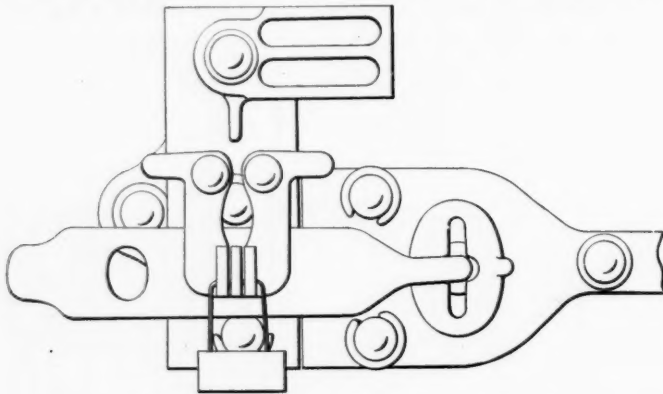
Method of Operating the Universal Gibraltar Fastener

lug. Through the ends of these pawls are holes which are in line with the hole through the lug. When the hasp is in place these drop down in front of it, and when a seal has been applied through the registering holes in the pawls and lug, it is impossible to remove the hasp without breaking the seal. The operation is very simple; it is necessary only to spread the pawls by compressing the outward extending upper ends between the thumb and forefinger of the left hand, while the hasp is moved with the right hand.

The door stop is a channel casting of malleable iron which envelops the car door stop, and serves also as a door guide. Both this and the door strap are gained in on the adjoining faces, thus providing flush metal surfaces of contact. The prying of doors which stick or bind is thus possible without injury to the woodwork.

All bolts are fastened inside the car, so that removal from the outside is impossible and none of the parts can be separated without removing the fastener from the car. It is made of malleable iron throughout and weighs 12 lb.

The "Universal Simplex" door fastener is a lighter and



Universal Gibraltar Car Door Fastener

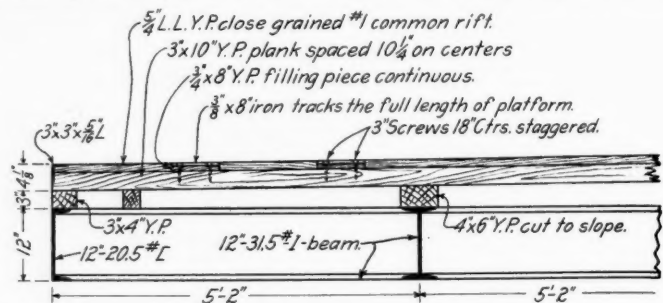
cheaper device than the one above described, having a weight of only 6½ lb. It possesses the same features of construction to secure safety and is easy to operate. The lug is extended horizontally to provide for two holes through it. One of these is for the pin and the other for the seal. The pin has a flat head, in which is a hole registering with the second hole in the lug when the pin is in place in front of the hasp. When sealed through these holes the hasp cannot be removed from the post without breaking the seal. The locking pin is secured to the stop casting with 6 in. of heavy welded chain.

STEEL RUNWAYS FOR FREIGHT HOUSES AND TRANSFER PLATFORMS

Steel runways have been used in freight house and transfer platforms for a number of years, the economies in maintenance and trucking labor fully justifying the expense of their installation. There are several reasons for this. The smooth surface reduces the rolling friction and permits increased loading of trucks and more rapid movement. The trucks ride smoother and less freight is shaken off, thus reducing breakages. The truckers invariably follow the runways, thus maintaining well-defined lines of travel, which reduce the congestion and confusion, and also reduce the wear on the less durable wooden floor.

At the Burr Oak transfer station of the Rock Island, near Chicago, the installation of two runways, 9 ft. center to center on transfer platforms 700 ft. long, resulted in an increase in the tonnage movement of 20 per cent per man, the average daily tonnage per man handled in July being 17.83 tons. The experience with these runways, which were made of second-hand materials, has suggested to J. W. Lawhead, agent at Burr Oak, the requirements of a good design of transfer platform with steel runways.

He recommends that each runway consist of two steel plates, ¼ in. thick by 6 in. wide, laid 18 in. center to center to fit the wheels of a standard truck. Between the two steel plates, a 12-in. plank should be laid to give a walkway for the truckers, as the wood is much easier to walk on than the steel surface. The plates should be attached to the platform with countersunk screws or bolts. The plates should also be counter sunk, so that the tops are flush with the rest of the platform. On a 28-ft. transfer platform the two runways should be 10 ft. center to center. The planking between the runways and outside of them should be laid transverse with



Steel Runways in Platform of the Pennsylvania Freight House at Pottsville

the platform, as practically all of the trucking done on the wooden surface will be in that direction.

The drawing shows the cross section through the platform of the Pottsville freight house of the Pennsylvania, which is equipped with 2 lines of ¾ in. by 8 in. plates to form a runway. Runways of this kind have been in use in the Mantua transfer station at West Philadelphia for over eight years and are giving excellent satisfaction.

The Philadelphia & Reading is using a runway in its Harrisburg freight house consisting of two lines of plates, ¼ in. thick by 9 in. wide, space 21 in. center to center. These runways are also used in a number of other freight houses. Prior to their installation, it was found necessary to renew sections of the planking on platforms about every two or three years, but since the installation of runways, some of the floors have not been removed for a period of over five years. They also find that with the steel runways the truckers have considerably greater confidence, and are now handling much heavier loads with greater rapidity of movement.

THE QUEENSLAND RAILWAYS.—On June 30, 1915, the total length of railways opened for traffic in Queensland was 4,838 miles, of which 268 miles was opened during the fiscal year ending on that date. Railway operation in Queensland is necessarily complicated by the geographical situation. There are three principal lines running west and southwest from the coast: the Great Western, from Brisbane in the south to Cunnamulla, 2,184 miles, with a branch to Cheepie; from Rockhampton in the centre to Longreach; and from Townsville in the north to Winton and Cloncurry. Five other lines open up the interior from the ports of Normanston, Cooktown, Cairns, Bowen and Mackay. The eastern termini of the southern and central sections are now connected by a part of the great coastal line from Gladstone to Cairns, which will ultimately give to North Queensland through railway communication with the Australian railway system generally. The central and northern sections, however, are still separated from each other. This will be remedied on the east by the completion of the coast line, of which 9 more miles were opened during the year under review, and 22 have since been opened, while the western termini will eventually be linked up by a great link authorized by Parliament, which will also serve the northwestern section of the state.

General News Department

The Midland Valley shops at Muskogee, Okla., were destroyed by fire on February 3, with three locomotives and a large number of cars.

F. Lavis, of New York, known to the readers of the *Railway Age Gazette* as a writer on South American topics, has become associated with the American International Corporation in an advisory capacity in regard to railway and general development projects in Central and South America. Mr. Lavis during the past five years has been in private engineering practice, engaged in making examinations of railway projects for financial institutions, both of this country and of Europe.

A strike of the switchmen belonging to the Switchmen's Union of North America was called on the Wabash at 6 o'clock on Saturday night, February 5, and the members of that union left their work. The strike was called, according to officers of the road, on account of a dispute between the Switchmen's Union and the Brotherhood of Railroad Trainmen, with which the road has a contract and whose members constitute a large majority of the Wabash switchmen. Members of the Brotherhood of Railroad Trainmen took the place of the strikers, and the road announced that if the strikers would apply for work by 7 o'clock Tuesday morning their applications would be considered, but that after that time applications would be refused.

The Chicago & North Western Railway has issued a strikingly illustrated poster for use in the anti-trespassing campaign. It is headed: "Do not trespass on railroad tracks or cars," and, after citing statistics regarding the number of trespassers, says "this is the only civilized country in the world that does not penalize trespassing on railroad tracks or cars. Why not enact and enforce a law similar to that recommended by the National Association of Railway Commissioners to prevent this slaughter? You or your child may be the next victim." At the top of the poster are shown a number of illustrations of the most common ways in which trespassing accidents occur. There is also shown a view of one of the 5,471 unnecessary funerals caused each year by trespassing accidents, and another illustration shows a large gathering of cripples, beneath which is printed: "Do you understand that all of the pain, misery, humiliation and disability caused by these injuries would be avoided if trespassing were stopped?"

The executives of seven western railroads on February 3 addressed a telegram to Congressman James R. Mann, of Illinois, protesting on behalf of the western railroads against the proposed legislation by the House of Representatives changing the system of railroad mail pay from the weight to the space basis, as embodied in the bill which has been reported from the House post office committee. It is declared that some of the provisions of the bill are impracticable and would work unjustly against the railroads. They can be compelled to perform important services for the government without sufficient compensation, and the post office department may conduct a freight business on the railroad passenger trains in active competition with the railroads at ruinously low rates arbitrarily fixed by the department. The telegram was signed by Hale Holden, president of the Chicago, Burlington & Quincy; Charles H. Markham, president of the Illinois Central; J. E. Gorman, chief executive officer of the Chicago, Rock Island & Pacific; A. J. Earling, president of the Chicago, Milwaukee & St. Paul; S. M. Felton, president of the Chicago Great Western; W. A. Gardner, president of the Chicago & Northwestern, and W. G. Bierd, of the Chicago & Alton.

Rock Island Fuel Department

In the *Railway Age Gazette* for January 28, page 172, an outline of the reorganization of the Rock Island fuel department was published, in which the organization regarding the inspection of the coal at the mine was incorrectly stated. The Rock Island has five fuel inspectors and one chief fuel inspector, who inspects all the fuel at the mines. This work is under the jurisdiction of D. B. Sebastian, assistant manager of the mining and fuel department.

Mr. Elliott's Address—Correction

In the address of Howard Elliott, president of the New York, New Haven & Hartford, printed elsewhere in this issue, a paragraph on page 238, middle of the second column, that stockholders of American railways receive less than two per cent of the gross earnings of the roads, should read "less than *ten* per cent." This correction of the advance sheets given to the newspapers is received as we go to press.

Report on Rockledge Collision

The Interstate Commerce Commission has issued a report, dated January 17, and signed by H. W. Belnap, chief of the division of safety, giving a statement and conclusions relative to the butting collision on the Nashville, Chattanooga & St. Louis, near Rockledge, Tenn., on December 23, when 12 employees of the road were killed. The statement of facts is substantially the same as that given in the *Railway Age Gazette* of January 21, but more in detail. The trains met about two miles south of Rockledge. The northbound train left Sherwood about two minutes before the southbound left Rockledge. The passenger train, at the time of collision, was moving up grade and at a speed of about 15 miles an hour, and the freight was running about 10 miles an hour. Neither locomotive was derailed. The engineman of the freight did not see the passenger train until the moment of collision.

As to the effect on the line wires of the work going on in connection with the changing of the location of the pole line, the report says: "It does not appear that in this case the signal wires were handled any differently than is frequently done in work of this character, although probably no great care was taken to prevent crosses or grounds in the signal wires when they were being transferred to the new pole line. On account of the nature of signal circuits, however, it is not necessary to exercise as great care in handling wires of this kind as with telegraph or telephone wires."

The dangers in signaling from foreign currents or from crosses in wires are discussed in the report, and alternating current apparatus is said to be "less likely to be affected by foreign current" than is direct current apparatus; but no recommendation is made. The signaling system in use on this part of the line "appears complicated, but . . . the circuits appear in general to be well designed and to provide for most contingencies of operation." In view of the location of this installation "even the best modern signal engineering practice would not call for the use of alternating current or any other special precautions against foreign current;" . . . but more complete protection would have been provided if the switch at Rockledge had been controlled from the tower; "and in that event this accident would probably have been averted."

National Railway Appliances Association

The indications point to a most successful exhibit of the National Railway Appliances Association, which will be held in the Coliseum and Annex, Chicago, on March 20 to 23, 1916, inclusive, during the convention of the American Railway Engineering Association at the Congress hotel. At the present time the amount of exhibit space taken and paid for is larger than at this time any previous year. A total of 140 companies have reserved space as listed below:

Acme Supply Co., Chicago, Ill.
The Adams & Westlake Co., Chicago, Ill.
Adams Motor & Manufacturing Co., Chicago, Ill.
Ajax Rail Anchor Co., Chicago, Ill.
Allith-Prouty Co., Danville, Ill.
American Guard Rail Fastener Co., Philadelphia, Pa.
American Hoist & Derrick Co., St. Paul, Minn.
American Kron Scale Co., New York, N. Y.
American Steel & Wire Co., Chicago, Ill.
American Valve & Meter Co., Cincinnati, Ohio.
American Vulcanized Fibre Co., Wilmington, Del.
Anchor Company, Chicago, Ill.
Armco Iron Culvert Manufacturers, Middletown, Ohio.
Asphalt Ready Roofing Co., New York, N. Y.
Associated Manufacturers of Malleable Iron, Cleveland, Ohio.

Ayer & Lord Tie Co., Inc., Chicago, Ill.
 Ballou Safety Rail Joint Co., Roanoke, Va.
 Barrett Manufacturing Co., New York, N. Y.
 Bausch & Lomb Optical Co., Chicago, Ill.
 Boss Nut Company, Chicago, Ill.
 L. S. Brach Supply Co., Newark, N. J.
 Bryant Zinc Co., Chicago, Ill.
 The Buda Co., Chicago, Ill.
 Carnegie Steel Co., Pittsburgh, Pa.
 Chicago Bridge & Iron Works, Chicago, Ill.
 The Chicago Flag & Decorating Co., Chicago, Ill.
 Chicago Malleable Castings Co., Chicago, Ill.
 Chicago Pneumatic Tool Co., Chicago, Ill.
 Chicago Railway Signal & Supply Co., Chicago, Ill.
 Cleveland Frog & Crossing Co., Cleveland, Ohio.
 Clyde Iron Works, Chicago, Ill.
 Commercial Acetylene Railway Light & Signal Co., New York, N. Y.
 Concrete Mixing & Placing Co., Chicago, Ill.
 The Creepcheck Co., Inc., New York, N. Y.
 Crerar-Adams & Co., Chicago, Ill.
 Cornell Wood Products Co., Chicago, Ill.
 Daniels Safety Device Co., Chicago, Ill.
 D. & A. Post Mold Co., Three Rivers, Mich.
 Detroit Graphite Co., Detroit, Mich.
 Paul Dickinson, Inc., Chicago, Ill.
 Dillworth-Porter & Co., Ltd., Pittsburgh, Pa.
 Joseph Dixon Crucible Co., Jersey City, N. J.
 The Duff Manufacturing Co., Pittsburgh, Pa.
 Thos. A. Edison, Inc., Bloomfield, N. J.
 Edison Storage Battery Co., Orange, N. J.
 The Electric Storage Battery Co., Philadelphia, Pa.
 Electric Railway Improvement Co., Cleveland, Ohio.
 Eymon Continuous Crossing Co., Marion, Ohio.
 Fairbanks, Morse & Co., Chicago, Ill.
 Fairmont Gas Engine & Railway Motor Car Co., Fairmont, Minn.
 Federal Signal Co., Albany, N. Y.
 The Fibre Conduit Co., Chicago, Ill.
 The Frictionless Rail, Boston, Mass.
 General Electric Co., Schenectady, N. Y.
 General Railway Signal Co., Rochester, N. Y.
 W. & L. E. Gurley, Troy, N. Y.
 Hall Switch & Signal Co., New York, N. Y.
 Hatfield Rail Joint Manufacturing Co., Macon, Ga.
 Hayes Track Appliance Co., Richmond, Ind.
 Hazard Manufacturing Co., Wilkes-Barre, Pa.
 Hoischen Manufacturing Co., Omaha, Neb.
 Hubbard & Co., Pittsburgh, Pa.
 The Indianapolis Switch & Frog Co., Springfield, Ohio.
 Ingersoll-Rand Co., New York, N. Y.
 The International Steel Tie Co., Cleveland, Ohio.
 H. W. Johns-Manville Co., New York, N. Y.
 The O. F. Jordan Co., Chicago, Ill.
 The Joyce-Cridland Co., Dayton, Ohio.
 Julian-Beggs Signal Co., Terre Haute, Ind.
 Kalamazoo Railway Supply Co., Kalamazoo, Mich.
 Kellogg Switchboard & Supply Co., Chicago, Ill.
 Kelly-Derby Company, Chicago, Ill.
 Keppler Glass Constructions, Inc., New York, N. Y.
 The Kerite Insulated Wire & Cable Co., New York, N. Y.
 Keystone Grinder & Manufacturing Co., Pittsburgh, Pa.
 Kilbourne & Jacobs Manufacturing Co., Columbus, Ohio.
 Lackawanna Steel Co., Lackawanna, N. Y.
 Lansing Company, Lansing, Mich.
 The Lehon Co., Chicago, Ill.
 Louisiana Red Cypress Co., New Orleans, La.
 Lumber Manufacturers' Agency, Centralia, Wash.
 John Lundie, New York, N. Y.
 Lufkin Rule Co., Saginaw, Mich.
 M. W. Supply Co., Philadelphia, Pa.
 MacRae's Blue Book Co., Chicago, Ill.
 The Madden Co., Chicago, Ill.
 C. F. Massey Co., Chicago, Ill.
 Miller Train Control Corporation, Danville, Ill.
 Morden Frog & Crossing Works, Chicago, Ill.
 Mudge & Co., Chicago, Ill.
 National Carbon Co., Cleveland, Ohio.
 National Concrete Machinery Co., Madison, Wis.
 National Lead Co., New York, N. Y.
 National Lock Washer Co., Newark, N. J.
 National Malleable Castings Co., Cleveland, Ohio.
 National Standard Co., Niles, Mich.
 Geo. P. Nichols & Bro., Chicago, Ill.
 Northwestern Motor Co., Eau Claire, Wis.
 Ogle Construction Co., Chicago, Ill.
 The Okonite Co., New York, N. Y.
 O'Malley-Bear Valve Co., Chicago, Ill.
 Otley Paint Manufacturing Co., Chicago, Ill.
 P. & M. Company, Chicago, Ill.
 W. W. Patterson Co., Pittsburgh, Pa.
 Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
 Pocket List of Railroad Officials, New York, N. Y.
 Positive Rail Anchor Co., Louisville, Ky.
 The Protective Signal Manufacturing Co., Denver, Colo.
 Pyrene Manufacturing Co., New York, N. Y.
 The Q. & C. Co., New York, N. Y.
 The Rail Joint Co., New York, N. Y.
 The Railroad Supply Co., Chicago, Ill.
 Railway Periodicals Co., Inc., New York, N. Y.
 Railway Review, Chicago, Ill.
 Ramapo Iron Works, Hillburn, N. Y.
 Reading Specialties Co., Reading, Pa.
 Roadmaster & Maintenance of Way Association, Sterling, Ill.
 Roberts & Schaefer Co., Chicago, Ill.
 Safety Rail Joint Co., Not Inc., Centralia, Ill.
 Sanitary Bunk Co., Indianapolis, Ind.
 Sellers Manufacturing Co., Chicago, Ill.
 Signal Accessories Co., New York, N. Y.
 Simmen Automatic Railway Signal Co., Buffalo, N. Y.
 Simmons-Boardman Publishing Co., New York, N. Y., and Chicago, Ill.
 T. W. Snow Construction Co., Chicago, Ill.
 Standard Asphalt & Rubber Co., Chicago, Ill.
 Standard Underground Cable Co., Pittsburgh, Pa.
 Staple Post Mold Co., Westerville, Ohio.
 Southern Pine Association, New Orleans, La.
 Templeton Kenley & Co., Ltd., Chicago, Ill.
 Titanium Alloy Manufacturing Co., Niagara Falls, N. Y.
 Track Specialties Co., New York, N. Y.
 Tyler Underground Heating System, Pittsburgh, Pa.

Union Switch & Signal Co., Swissvale, Pa.
 U. S. Wind Engine & Pump Co., Batavia, Ill.
 Verona Tool Works, Pittsburgh, Pa.
 Wm. T. Walker Rail Bender Co., Chicago, Ill.
 Wayne Oil Tank & Pump Co., Fort Wayne, Ind.
 Western Electric Co., New York, N. Y.
 Wm. Wharton, Jr., & Co., Inc., Philadelphia, Pa.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, date of next or regular meetings, and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention March 21-23, 1916, Chicago.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
 GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month. Room 1856, Transportation Bldg., Chicago.
 NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, 349 People's Gas Bldg., Chicago. Next convention, March 21-23, 1916, Chicago.
 NEW ENGLAND RAILROAD CLUB.—W. F. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.
 NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
 NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
 PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
 RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
 RAILROAD MEN'S IMPROVEMENT SOCIETY.—J. B. Curtan, Erie R. R., 50 Church St., New York. Meetings, alternate Thursdays, October to May, Assembly Rooms of Merchants' Association, Woolworth Bldg., New York.
 RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Midyear meeting, March 20, Chicago. Next annual convention, September, 1916, Grand Hotel, Mackinac Island, Mich.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
 SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, April, 1916.
 SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.
 TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
 TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
 TRAFFIC CLUB OF NEWARK.—Roy S. Bushy, Firemen's Bldg., Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, 559 Broad St., Newark.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
 TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Agt., Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings, bi-monthly, Pittsburgh.
 TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings, October to May.
 TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 21, 1916, Toronto, Ont.
 TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., East Buffalo, N. Y. Next meeting, September, 1916, Chicago.
 UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
 WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
 WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Grand Pacific Hotel, Chicago.
 WESTERN SOCIETY OF ENGINEERS.—E. N. Layfield, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1915.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.).	Maintenance of way and structures.	Equipment.	Traffic.	Trans- portation.	Miscel- laneous.	General.	Total.
Alabama & Vicksburg.....	143	\$104,549	\$42,000	\$158,549	\$14,909	\$35,135	\$3,838	\$50,097	\$1,864	\$5,353	\$111,195
Alabama Great Southern.....	309	368,054	108,115	514,301	41,172	31,255	13,612	136,402	2,221	9,072	\$47,322
Ann Arbor.....	301	203,171	44,211	261,754	14,258	34,099	4,307	93,401	3,304	14,000	179,917
Arizona Eastern.....	378	219,508	33,900	271,612	48,279	20,574	2,189	62,688	1,453	10,570	162,943
Archison, Topeka & Santa Fe.....	8,626	6,363,818	2,223,342	9,436,929	1,089,322	1,353,908	210,978	2,536,818	.....	292,902	101,385
Atlanta & West Point.....	93	63,266	42,442	121,924	12,257	19,205	5,867	33,483	1,789	4,675	126,282
Atlanta, Birmingham & Atlantic.....	638	240,648	55,991	318,579	38,898	55,158	14,161	108,749	1,789	9,629	3,690
Atlantic City.....	170	71,613	32,926	104,539	32,792	17,363	2,027	83,910	61	902	7,405
Atlantic Coast Line.....	4,700	2,329,806	793,323	3,392,451	345,218	430,445	57,883	985,139	9,087	78,627	12,154
Baltimore & Ohio.....	4,535	7,346,473	1,165,818	9,104,762	1,010,496	1,980,786	154,684	3,123,119	58,464	212,746	10,000
Baltimore & Ohio Chicago Terminal.....	79	.....	322	143,338	11,168	18,037	1,030	77,826	1,198	4,855	145,000
Baltimore, Chesapeake & Atlantic.....	88	47,518	28,666	80,426	3,361	56,303	1,591	48,870	.....	3,863	17,654
Baugh & Aroostook.....	632	244,384	52,120	312,741	41,960	49,514	2,746	85,028	2,644	11,507	35,590
Belt Ry. Co. of Chicago.....	31	.....	221,143	221,143	22,670	30,104	742	110,812	.....	7,979	106,949
Bessemer & Lake Erie.....	205	592,722	27,883	638,801	69,343	177,100	12,662	182,174	.....	32,300	10,759
Bingham & Garfield.....	27	168,306	3,306	172,398	15,785	16,103	1,115	23,370	75	2,276	156,077
Boston & Maine.....	2,302	2,651,911	1,143,328	4,200,094	499,692	584,804	30,913	1,886,918	16,803	136,576	17,781
Buffalo & Susquehanna Railway.....	91	6,864	7,317	14,181	1,327	3,985	1,013	4,907	3	5,674	5,076
Buffalo & Susquehanna R. R. Corporation	253	166,260	7,102	173,652	16,168	37,785	1,215	46,882	.....	2,600	187,767
Buffalo, Rochester & Pittsburgh.....	586	878,792	90,811	1,008,525	132,289	243,541	1,413	329,748	1,215	22,649	671
Canadian Pacific Lines in Maine.....	233	202,017	23,359	235,760	24,232	26,371	5,223	102,261	.....	3,559	20,000
Carolina, Clinchfield & Ohio.....	283	209,127	17,073	230,892	23,978	29,562	9,437	41,374	.....	9,473	74,114
Carolina, Clinchfield & Ohio of S. C.....	18	13,799	1,827	16,056	1,012	80	1,622	2,581	.....	1,081	12,000
Central New England.....	304	328,632	39,976	388,439	33,563	41,726	1,164	134,833	.....	4,204	14,250
Central of Georgia.....	1,924	754,885	303,218	1,118,171	129,006	188,471	36,321	372,754	1,061	36,519	173,013
Charleston & Western Carolina.....	343	137,589	37,761	186,446	26,732	23,238	2,902	54,316	.....	5,748	12,800
Chesapeake & Ohio Lines.....	3,374	3,088,375	301,391	4,003,601	445,784	850,338	52,473	1,151,192	24,357	78,010	5,000
Chicago & Alton.....	1,052	895,772	322,206	1,322,575	129,169	282,958	34,282	490,911	9,394	30,260	1,402,625
Chicago & Eastern Illinois.....	1,282	1,178,757	252,413	1,543,795	163,065	329,599	25,285	523,485	7,175	39,819	1,222,417
Chicago & North Western.....	8,108	4,763,035	1,713,291	7,272,491	633,861	1,160,208	102,641	2,675,132	50,514	153,448	308,353
Chicago, Burlington & Quincy.....	9,370	6,411,262	1,727,299	8,926,718	662,235	1,238,636	123,087	2,612,003	62,004	167,264	56,100
Chicago Great Western.....	1,427	950,010	271,423	1,326,884	148,165	203,936	42,980	468,513	8,597	36,190	369,063
Chicago, Indianapolis & Louisville.....	622	427,955	150,058	626,250	69,257	89,958	19,277	225,008	406	1,537	45,442
Chicago Junction.....	13	6,555	150,058	197,654	10,455	17,648	984	109,318	.....	5,137	37,643
Chicago, Milwaukee & St. Paul.....	10,076	6,858,997	1,480,048	9,212,150	585,223	1,403,535	131,866	3,301,834	63,379	159,414	173,949
Chicago, Peoria & St. Louis.....	255	143,632	25,125	172,935	17,994	25,491	5,661	62,862	.....	5,272	112,800
Chicago, Rock Island & Gulf.....	477	231,515	55,104	307,699	44,584	850,338	52,473	1,151,192	24,357	78,010	68,508
Chicago, Rock Island & Pacific.....	7,663	4,404,092	1,523,104	6,367,983	798,686	1,011,798	130,254	2,273,502	40,419	150,855	1,222,417
Chicago, St. Paul, Minn. & Omaha.....	1,752	1,193,671	423,583	1,735,555	142,303	201,140	32,439	619,200	14,833	8,352	308,353
Chicago, Terre Haute & Southeastern.....	373	247,549	17,687	270,227	19,894	43,046	3,882	71,436	1,111	8,352	112,800
Cincinnati, New Orleans & Texas Pacific.....	337	756,301	172,193	986,956	88,022	237,205	29,598	276,400	5,703	23,748	10,417
Cincinnati Northern.....	246	130,401	17,693	151,146	20,124	31,952	3,147	41,103	.....	7,837	32,000
Cleveland, Cincinnati, Chicago & St. L.....	2,381	2,681,084	774,346	3,707,946	291,003	625,477	3,147	1,278,093	22,073	76,837	4,871
Colorado & Southern.....	1,089	665,667	104,118	811,935	78,598	142,311	9,621	217,753	3,506	23,833	110,131
Colorado Midland.....	338	104,612	10,166	125,662	13,734	32,344	7,368	54,753	695	3,298	1,298,491
Cripple Creek & Colorado Springs.....	87	105,786	13,291	121,081	15,302	13,009	3,146	27,279	.....	3,550	35,000
Cumberland Valley.....	164	224,948	53,410	293,116	37,423	29,788	3,682	98,135	.....	11,443	4,622
Delaware, Lackawanna & Western.....	955	3,126,232	710,198	4,222,198	356,994	680,484	72,175	1,394,127	29,536	87,978	6,300
Denver & Rio Grande.....	2,566	1,530,268	346,088	2,009,477	114,150	325,345	40,984	554,443	25,403	54,549	9,934
Detroit & Mackinac.....	393	52,924	28,147	87,804	9,034	15,213	1,797	32,447	.....	2,807	801,466
Detroit & Toledo Shore Line.....	81	174,366	175,690	350,056	9,399	9,390	1,442	44,096	.....	2,691	15,139
Detroit, Toledo & Ironton.....	441	158,231	13,675	185,937	17,492	21,812	4,113	83,093	.....	6,119	103,097
Duluth & Iron Range.....	288	67,212	23,231	99,526	29,295	48,910	2,781	71,363	.....	27,514	5,575
Duluth, Missabe & Northern.....	390	65,301	29,614	98,279	62,175	79,912	2,333	63,431	10,103	39,776	6,000
Duluth, South Shore & Atlantic.....	628	187,166	73,129	278,834	26,969	34,875	7,298	102,473	3,347	8,141	11,501
Duluth, Winnipeg & Pacific.....	187	105,062	20,801	129,986	12,408	13,538	1,807	46,432	695	5,637	48,868
Elgin, Joliet & Eastern.....	789	1,029,289	166,430	1,395,719	55,231	219,909	8,489	326,718	.....	40,880	6,642
El Paso & Southwestern Co.....	1,027	626,996	166,430	842,065	103,033	112,909	7,489	211,836	6,115	26,292	41,939
Florida East Coast.....	745	392,808	147,235	621,858	56,719	61,555	13,067	138,326	3,079	12,053	49,914
Fort Worth & Denver City.....	454	422,274	153,366	601,227	62,209	78,011	5,394	165,005	2,127	16,329	261,800
Galveston, Harrisburg & San Antonio.....	1,351	811,582	294,662	1,177,554	178,577	140,791	27,777	420,648	11,377	31,547	19,900
Galveston Wharf.....	13	.....	131,601	131,601	3,068	1,477	472	40,350	32,577	435	64,042
Georgia.....	307	185,422	79,431	289,210	23,514	46,240	11,795	107,964	100	7,930	10,000
Georgia Southern & Florida.....	395	128,905	68,472	230,757	21,736	37,258	6,786	81,893	69	8,939	43,222
Grand Rapids & Indiana.....	575	324,886	123,758	482,531	12,053	82,630	1,830	193,718	.....	14,258	100,846
Great Northern.....	8,102	5,675,382	1,136,992	7,444,004	446,074	694,489	82,838	1,949,264	70,827	104,376	20,334
Gulf & Ship Island.....	308	130,777	33,453	174,006	12,773	26,354	4,188	48,949	353	6,376	400,316
Gulf, Colorado & Santa Fe.....	1,938	1,097,691	286,002	1,463,421	225,538	202,320	28,999	612,515	.....	52,216	3,788

* Figures shown here are for period December 1-13, 1915. Reorganized on this date.

VALUES AND LIVES—CONTINUED

MONTH OF DECEMBER, 1915—Continued											
Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net from operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) with last year.
		Freight.	Passenger.	Total.	Maintenance way and structures.	Traffic.	Transportation.				
Hocking Valley	351	446,190	74,672	559,348	57,818	8,782	182,806	702	15,020	390,580	94,693
Houston & Texas Central	191	430,894	1,189,332	6,076,823	17,940	23,153	378,948	146,108	3,961	429,910	44,176
Illinois Central	895	4,468,071	1,189,332	6,076,823	17,940	23,153	378,948	146,108	3,961	429,910	68,356
Indiana Harbor Belt	110	63,539	177,261	907,920	13,284	121,124	1,491	8,561	30,296	616,867	306,404
Indiana Northern	1,159	63,539	177,261	907,920	13,284	121,124	1,491	8,561	30,296	616,867	105,749
International & Great Northern	738	675,224	1,189,332	6,076,823	17,940	23,153	378,948	146,108	3,961	429,910	154,590
Kanawha & Michigan	837	675,224	1,189,332	6,076,823	17,940	23,153	378,948	146,108	3,961	429,910	154,590
Kansas City, Mexico & Orient	907	155,261	329,518	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Kansas City Southern	296	2,207,314	329,518	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Lake Erie & Western	398	330,439	508,783	995,381	34,403	34,403	34,403	34,403	34,403	34,403	34,403
Lehigh & Hudson River	279	155,261	329,518	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Lehigh & New England	351	162,007	321,907	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Long Island	379	155,261	329,518	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Long Island & Arkansas	351	162,007	321,907	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Louisiana Ry. & Navigation Co.	208	3,790,281	995,637	5,154,737	33,111	141,177	69,475	6,076	130,279	1,282,549	634
Louisiana Western	200	615,298	246,503	924,340	27,079	25,125	59,114	9,384	11,490	14,990	634
Louisiana & Nashville	1,220	128,682	515,692	3,054,389	256,226	35,515	3,078	7,851	100,391	133,428	634
Louisville & Henderson	380	2,315,082	297,994	2,986,986	698,983	489,721	78,157	6,076	130,279	1,282,549	634
Maine Central	365	2,012,568	784,033	1,251,217	34,946	26,079	78,157	6,076	130,279	1,282,549	634
Midland Valley	334	96,588	23,758	484	28,346	18,256	58,699	6,076	130,279	1,282,549	634
Minneapolis & Sault Ste. Marie	125	27,186	409,059	2,703,601	354,465	492,023	55,087	7,136	11,490	14,990	634
Missouri & North Arkansas System	1,231	767,903	236,933	93,577	150,578	62,570	28,372	10,262	109,768	44,911	1,501
Missouri, Kansas & Gulf of Texas	1,122	2,072,933	111,293	1,011,468	1,011,468	90,320	189,332	10,262	109,768	44,911	1,501
Missouri, Oklahoma & Gulf of Texas	1,122	2,072,933	111,293	1,011,468	1,011,468	90,320	189,332	10,262	109,768	44,911	1,501
Missouri, Oklahoma & Gulf of Texas	1,122	2,072,933	111,293	1,011,468	1,011,468	90,320	189,332	10,262	109,768	44,911	1,501
Missouri Pacific	405	155,261	329,518	907,920	13,284	121,124	1,491	8,561	30,296	616,867	154,590
Mobile & Ohio	165	767,903	236,933	93,577	150,578	62,570	28,372	10,262	109,768	44,911	1,501
Monongahela	204	2,823,377	53,973	338,987	22,337	22,337	22,337	22,337	22,337	22,337	22,337
Morgan's L. & Texas R. & S. Co.	285	108,867	30,110	150,978	23,277	22,974	43,465	506,195	67,284	114,313	17,904
Nashville, Chattanooga & St. Louis	286	119,059	107,579	6,057,554	732,402	39,216	7,152	290,450	88,427	2,925,830	17,904
Nevada, Northern & Eastern	569	1,080,440	2,362,125	6,705,024	63,092	135,559	5,469	140,681	8,468	79,150	3,421,923
New Orleans, Great Northern	2,005	2,941,981	1,020,898	1,386,595	479,243	50,047	55,601	506,195	67,284	114,313	17,904
New Orleans, Mobile & Texas	569	1,080,440	2,362,125	6,705,024	63,092	135,559	5,469	140,681	8,468	79,150	3,421,923
New Orleans, Texas & Mexico	569	1,080,440	2,362,125	6,705,024	63,092	135,559	5,469	140,681	8,468	79,150	3,421,923
New Orleans, Texas & Mexico	569	1,080,440	2,362,125	6,705,024	63,092	135,559	5,469	140,681	8,468	79,150	3,421,923
New York, Chicago & St. Louis	112	289,371	534,827	4,713,143	57,160	60,181	91,500	181,771	72,506	110,840	444,961
New York, New Haven & Hartford	112	289,371	534,827	4,713,143	57,160	60,181	91,500	181,771	72,506	110,840	444,961
New York, Ontario & Western	2,049	4,029,909	277,894	1,062,800	6,708,453	38,894	4,085	113,290	12,433	3,589,088	426,638
New York, Philadelphia & Norfolk	908	5,068,375	1,082,390	6,708,453	55,047	38,894	4,085	113,290	12,433	3,589,088	426,638
Norfolk & Western	6,510	507,829	1,082,390	6,708,453	55,047	38,894	4,085	113,290	12,433	3,589,088	426,638
Norfolk Southern	507	374,829	86,595	507,829	50,047	50,047	50,047	50,047	50,047	50,047	50,047
Norfolk Pacific	670	374,829	86,595	507,829	50,047	50,047	50,047	50,047	50,047	50,047	50,047
Northern Pacific	1,758	3,971,031	937,638	5,398,053	502,843	907,540	87,764	1,864,809	23,437	433,526	13,340,568
Northern Pacific	1,758	3,971,031	937,638	5,398,053	502,843	907,540	87,764	1,864,809	23,437	433,526	13,340,568
Panhandle & Santa Fe	4,541	1,379,799	338,454	5,010,443	297,979	639,284	44,396	1,748,613	25,483	100,926	2,876,834
Panhandle & Santa Fe	4,541	1,379,799	338,454	5,010,443	297,979	639,284	44,396	1,748,613	25,483	100,926	2,876,834
Pennsylvania Company	2,247	1,379,799	338,454	5,010,443	297,979	639,284	44,396	1,748,613	25,483	100,926	2,876,834
Pennsylvania Railroad	1,120	4,204,885	784,891	1,979,228	278,614	744,722	1,482	1,356,376	69,412	5,661	85,619
Pennsylvania Railroad	1,120	4,204,885	784,891	1,979,228	278,614	744,722	1,482	1,356,376	69,412	5,661	85,619
Pere Marquette	717	990,885	765,397	3,984,624	573,521	53,046	38	68,627	5,985	8,683	205,376
Pere Marquette	717	990,885	765,397	3,984,624	573,521	53,046	38	68,627	5,985	8,683	205,376
Philadelphia, Baltimore & Washington	1,489	2,284,437	90,689	27,722	28,966	18,643	4,329	54,394	5,193	151,600	52,999
Philadelphia, Baltimore & Washington	1,489	2,284,437	90,689	27,722	28,966	18,643	4,329	54,394	5,193	151,600	52,999
Philadelphia, Cincinnati, Chic. & St. Louis	294	151,079	90,689	27,722	28,966	18,643	4,329	54,394	5,193	151,600	52,999
Philadelphia, Cincinnati, Chic. & St. Louis	294	151,079	90,689	27,722	28,966	18,643	4,329	54,394	5,193	151,600	52,999
Pittsburgh, Shawmut & Potomac	468	139,633	26,765	59,221	29,040	621,535	65,010	1,311,631	9,206	2,628,528	56,234
Pittsburgh, Shawmut & Potomac	468	139,633	26,765	59,221	29,040	621,535	65,010	1,311,631	9,206	2,628,528	56,234
Port Reading	258	2,988,825	1,012,196	4,148,527	39,159	32,098	3,723	73,296	10,773	62,564	1,842,009
Port Reading	258	2,988,825	1,012,196	4,148,527	39,159	32,098	3,723	73,296	10,773	62,564	1,842,009
Richmond, Fredericksburg & Potomac	4751	125,465	59,221	3,088,744	30,069	6,414	4,329	54,394	5,193	151,600	52,999
Richmond, Fredericksburg & Potomac	4751	125,465	59,221	3,088,744	30,069	6,414	4,329	54,394	5,193	151,600	52,999
Rutland	3,363	2,319,110	25,401	94,191	15,938	108,280	2,163	30,087	4,610	27,728	359,629
Rutland	3,363	2,319,110	25,401	94,191	15,938	108,280	2,163	30,087	4,610	27,728	359,629
St. Joseph & Grand Island	244	565,029	135,934	745,453	60,208	82,253	12,601	156,364	3,403	18,901	296,787
St. Joseph & Grand Island	244	565,029	135,934	745,453	60,208	82,253	12,601	156,364	3,403	18,901	296,787
St. Louis & San Francisco	943	280,876	84,573	395,575	68,425	57,255	3,919	76,486	10,399	61,283	3,458
St. Louis & San Francisco	943	280,876	84,573	395,575	68,425	57,255	3,919	76,486	10,399	61,283	3,458
St. Louis, Iron Mountain & Southern	724	596,297	241,121	2,728,108	631,045	298,231	67,614	1,264,386	2,969,479	43,002	6,765
St. Louis, Iron Mountain & Southern	724	596,297	241,121	2,728,108	631,045	298,231	67,614	1,264,386	2,969,479	43,002	6,765
St. Louis, San Francisco & Texas	1,147	1,548,801	505,245	6,198,970	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, San Francisco & Texas	1,147	1,548,801	505,245	6,198,970	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
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St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546	7,286	17,819	7,286
St. Louis, Southwestern of Texas	3,449	4,037,032	1,886,530	9,362,253	12,672	1,335,654	905,161	169,546			

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) income comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of way and structures.	Equip- ment.	Traffic.	Trans- portation.	Miscel- laneous.				
Terminal R. R. Ass'n of St. Louis.....	37	1,369,418	228	274,431	34,719	11,947	863	92,304	5,123	144,957	22,780	106,694	34,768
Texas & Pacific.....	1,944	443,899	228	1,943,972	211,568	24,757	38,555	724,303	14,892	1,277,565	125,630	540,532	158,680
Texas & New Orleans.....	468	258,793	98,469	399,340	66,563	87,944	7,466	136,496	13,009	321,206	22,958	22,958	89,689
Teleso, Peoria & Western.....	248	59,774	40,376	105,631	15,100	30,211	1,946	39,050	3,581	89,887	6,600	8,145	12,609
Toledo, St. Louis & Western.....	451	456,987	30,802	515,498	64,550	82,941	16,989	170,390	.....	325,636	18,400	171,462	122,413
Union R. R. Co. of Baltimore.....	8	128,905	22,336	153,277	23,077	3,006	.....	165,131	.....	29,896	3,659	119,722	17,417
Union R. R. of Pennsylvania.....	31	819,813	196,333	1,016,146	152,846	195,574	22,896	387,157	9,774	703,789	38,349	79,583	170,932
Vandalia.....	171	91,821	48,721	155,491	17,434	27,382	3,845	45,304	1,870	101,665	8,341	31,143	103,700
Virginia, Seaboard & Pacific.....	225	136,514	15,210	151,724	22,069	35,366	2,064	45,391	.....	108,573	6,903	43,485	40,048
Virginia & Southwestern.....	504	412,144	39,595	451,739	52,300	91,962	5,327	115,475	11,270	191,914	24,000	168,514	40,389
Washington.....	2,519	2,172,646	506,782	2,900,460	304,162	398,324	82,083	1,075,346	15,160	1,934,219	82,309	882,959	608,856
Washington Southern.....	36	44,624	52,063	129,269	18,199	12,147	1,446	41,698	2,353	79,151	3,724	46,393	25,317
Western Maryland.....	664	838,164	69,116	952,747	104,555	140,352	5,674	311,012	20,780	602,976	349,771	28,000	321,771
Western Pacific.....	941	389,022	61,218	491,817	54,277	66,987	25,878	188,300	11,199	364,552	21,132	105,474	71,892
Western Ry. of Alabama.....	133	64,423	37,749	115,399	16,795	19,938	1,588	32,441	4,855	81,690	5,162	27,988	17,640
West Jersey & Seashore.....	338	215,130	235,337	490,300	128,668	95,170	10,269	243,599	2,788	497,012	19,845	26,589	64,377
Wheeling & Lake Erie.....	512	663,733	50,111	774,345	77,080	111,610	1,547	238,764	1,547	450,609	33,053	290,683	318,184
Yazoo & Mississippi Valley.....	1,382	1,011,441	302,205	1,368,842	125,442	169,976	17,491	391,849	29,246	735,365	50,000	583,341	177,438
Alabama & Vicksburg.....	143	\$549,628	\$216,661	\$836,366	\$100,473	\$184,231	\$21,984	\$279,854	\$12,850	\$632,317	\$53,655	\$150,395	\$92,810
Alabama Great Southern.....	309	1,947,013	580,643	2,710,633	243,246	644,042	77,088	789,341	19,263	1,824,138	88,496	93,335	345,447
Ann Arbor.....	297	953,912	298,932	1,338,316	132,489	192,438	28,655	463,598	3,248	885,096	453,220	76,800	376,185
Arizona Eastern.....	378	1,208,286	205,547	1,507,092	209,591	138,622	13,648	327,761	6,086	756,456	750,637	631,647	354,647
Atchafalaya, Topeka & Santa Fe.....	8,623	35,987,347	15,207,602	55,997,221	7,293,937	12,821,918	1,228,327	14,727,190	.....	32,663,471	2,545,481	20,770,345	4,407,620
Atlanta & West Point.....	93	345,573	236,075	671,574	77,613	128,071	33,447	193,472	12,395	26,633	35,031	162,129	93,347
Atlanta, Birmingham & Atlantic.....	638	1,166,887	293,333	1,573,213	236,789	270,383	178	520,331	56,196	1,230,331	342,881	263,045	154,119
Atlantic City.....	170	457,548	902,165	1,429,083	215,632	171,855	19,134	652,046	594	1,015,513	413,570	353,411	77,391
Atlantic Coast Line.....	4,700	10,529,838	3,680,076	15,407,954	2,179,501	2,720,578	329,852	5,260,624	43,196	43,276	10,955,543	4,452,442	837,000
Baltimore & Ohio.....	4,535	44,168,816	7,846,168	56,040,304	6,348,097	11,517,969	962,464	17,503,286	309,710	1,198,762	37,838,403	18,201,902	1,715,183
Baltimore & Ohio Chicago Terminal.....	79	.....	3,654	874,875	103,218	98,050	5,298	374,663	10,764	45,243	615,001	152,493	38,658
Baltimore, Chesapeake & Atlantic.....	632	390,596	249,116	667,665	45,963	224,160	9,292	345,076	.....	20,801	13,426	9,661	88,361
Bangor & Aroostook.....	88	1,232,403	335,771	1,694,018	280,079	293,112	16,431	465,177	19,538	1,140,752	553,259	477,200	24,725
Belt Ry. Co. of Chicago.....	31	.....	207,863	1,416,899	108,929	159,990	3,916	596,572	.....	36,493	905,899	446,448	305,863
Bessemer & Lake Erie.....	205	6,140,144	207,863	6,443,286	453,912	992,827	59,874	1,307,418	.....	9,089	2,855,610	3,887,029	928,204
Bingham & Garfield.....	27	992,499	18,518	1,015,079	97,946	89,763	6,001	130,328	614	12,020	336,672	27,316	651,091
Boston & Maine.....	2,302	15,098,444	8,192,500	25,634,304	3,276,879	3,188,709	213,730	10,328,229	98,762	628,922	17,735,232	7,899,072	343,459
Buffalo & Susquehanna R. R. Corporation.....	91	83,318	33,851	130,647	24,669	33,229	2,415	61,975	130	12,767	135,185	8,671	13,217
Buffalo & Susquehanna R. R. Corporation.....	233	804,630	41,424	858,338	125,816	210,207	6,239	225,859	.....	34,327	602,447	255,891	156,302
Buffalo, Rochester & Pittsburgh.....	586	5,165,672	599,274	5,978,013	969,577	1,324,465	69,924	1,784,780	7,064	128,995	4,284,804	1,573,170	325,288
Canadian Pacific Lines in Maine.....	233	484,784	112,474	646,064	133,986	93,386	31,275	270,055	.....	21,753	550,455	23,609	108,518
Carolina, Clinchfield & Ohio of S. C.....	18	65,008	8,583	139,753	134,141	163,408	51,552	230,035	.....	54,097	637,536	712,247	155,415
Central New England.....	304	2,134,013	241,329	2,476,093	293,061	192,619	10,353	687,497	.....	28,293	1,188,744	4,500	6,561
Central of Georgia.....	1,924	4,219,128	1,626,533	6,479,350	823,946	1,041,282	209,901	2,084,070	6,598	230,834	1,287,349	76,800	767,191
Charleston & Western Carolina.....	343	677,020	180,592	905,900	159,360	113,665	18,977	294,737	.....	28,610	615,288	290,611	136,421
Chesapeake & Ohio Lines.....	2,374	19,049,171	3,178,890	23,636,289	2,720,454	4,953,829	313,908	6,670,447	127,247	450,744	15,228,884	7,557,200	2,570,444
Chicago & Alton.....	1,052	5,477,340	2,054,539	8,153,310	984,014	1,737,789	210,877	2,693,295	59,185	181,802	5,810,593	2,342,717	2,077,389
Chicago & Eastern Illinois.....	1,282	6,415,418	1,516,238	8,589,020	1,180,204	1,998,482	140,789	2,831,052	43,633	229,869	6,406,832	326,600	1,853,472
Chicago & North Western.....	8,108	30,326,012	11,358,300	46,473,797	6,027,129	7,409,182	660,612	15,556,847	322,718	918,543	30,752,771	15,721,026	2,215,863
Chicago, Burlington & Quincy.....	9,367	35,983,977	11,511,869	52,258,878	5,765,988	7,479,090	773,092	14,784,332	414,488	982,286	30,199,277	22,059,601	2,597,906
Chicago Great Western.....	1,427	5,213,843	1,720,759	7,084,052	1,080,981	1,282,867	270,553	2,553,513	50,665	201,498	5,431,014	1,873,352	2,027,151
Chicago, Indianapolis & Louisville.....	622	2,573,819	957,500	3,824,812	449,112	611,803	116,194	1,258,764	1,247	111,145	2,579,770	163,480	392,921
Chicago, Milwaukee & St. Paul.....	13	.....	.....	1,133,439	124,091	103,889	5,919	577,862	.....	32,953	844,714	19,167	269,547
Chicago, Milwaukee & St. Paul.....	10,076	38,999,287	10,046,412	54,402,746	5,058,108	7,925,117	921,063	18,369,845	398,788	945,726	32,650,282	21,752,464	5,127,635
Chicago, Peoria & St. Louis.....	255	681,286	154,755	886,559	134,446	166,442	34,077	348,756	.....	32,431	716,151	170,408	29,799
Chicago, Rock Island & Gulf.....	477	1,189,056	333,736	1,650,567	252,445	200,225	55,814	544,854	11,640	46,644	1,111,429	537,138	86,273
Chicago, Rock Island & Pacific.....	7,660	24,378,904	9,801,388	36,956,261	5,776,808	6,848,696	840,850	13,283,504	289,506	920,151	27,575,357	9,359,904	1,752,601
Chicago, St. Paul, Minn. & Omaha.....	1,753	6,446,634	2,754,051	9,954,321	1,332,063	1,233,260	177,798	3,400,963	93,936	229,233	6,453,885	3,500,466	520,529
Chicago, Terre Haute & Southeastern.....	374	1,111,487	98,851	1,242,131	170,738	235,112	23,167	341,780	4,974	50,963	876,734	415,397	352,868
Cincinnati, New Orleans & Texas Pacific.....	337	4,024,292	865,649	5,194,416	536,105	1,310,097	146,163	1,496,830	29,749	118,803	3,637,615	1,556,800	423,127
Cincinnati Northern.....	246	769,819	114,283	921,161	156,110	139,187	16,140	289,318	.....	19,294	620,409	32,371	35,618
Cleveland, Cincinnati, Chicago & St. L.....	2,381	14,828,270	4,685,415	21,321,887	2,351,448	3,827,386	441,508	6,906,345	148,154	446,320	14,070,515	7,251,312	2,069,679
Colorado & Southern.....	1,089	3,432,525	759,375	4,490,644	580,333	837,550	59,411	1,221,998	26,154	140,423	2,885,869	1,604,776	312,138
Colorado Midland.....	338	661,869	117,481	842,614	138,785	193,303	43,970	338,372	7,668	33,963	706,060	37,010	19,544
Cripple Creek & Colorado Springs.....	87	580,953	152,294	745,208	110,315	77,033	25,243	179,517	.....	30,678	412,786	332,422	300,152

† Figures shown here are for period July 1-December 13, 1915. Reorganized on this date.

Traffic News

Trains 6 and 11 of the Baltimore & Ohio, the eight-hour trains between St. Louis and Cincinnati, during the last twelve months ran 247,070 miles in 361,280 minutes, and reached destination on time on 98.5 per cent of their trips. The officers of the road believe that these trains, covering a distance of 339 miles between terminals, have established a record which has seldom been approached.

The Board of Commerce and Navigation of the State of New Jersey proposes to get the Interstate Commerce Commission to order a reduction in freight rates from the West to Jersey City and other points in the State of New Jersey situated near the Hudson river; and George L. Record, of Jersey City, has been engaged as special counsel to present a complaint to the commission. The cities and towns on behalf of which the complaint is being made have the same rates on freight from the West as are made to New York City; and the argument is that, as it costs on the average \$26.40 to carry a carload of freight across the Hudson river to New York, the rates to points on the west side of the river should be in that proportion less than the New York rate.

Railroad operation has been seriously affected in many districts during the past week by floods in the valley of the Mississippi river and its tributaries, particularly in Arkansas, where the Arkansas river reached the highest stage in its history, breaking the levees in several places and inundating a large extent of territory, including several towns. Railroad traffic between St. Louis and the southwest was interrupted. The St. Louis Southwestern on February 6 sent a relief train into the flooded district. In southeastern Arkansas, according to reports, the floods created a lake nearly 40 miles long and 30 miles wide. Rivers in Indiana were also at flood stage, washing out railroad tracks and bridges in several places. Traffic in the northwest has suffered interruptions throughout the last ten days on account of heavy snow in the Cascade mountains, and several transcontinental trains have arrived at Chicago a day or two late. Traffic out of Portland, Seattle and Tacoma was interfered with by an unusually heavy storm on February 1, 2 and 3, and train service in the Lake Superior country was interrupted by blizzards about the same time.

Southern Pacific Ticket Agents on Educational Trip

A large party of western Southern Pacific ticket agents is returning to California after an educational trip through the East. This trip was made for the purpose of giving the ticket sellers a greater familiarity with the territory both on and off the company's lines, to which they sell tickets and about which they are required to give information for the benefit of passengers. This is accordance with the plan adopted by the Southern Pacific in 1914, before the Panama-Pacific Exposition, when a large number of the company's ticket agents in the East that had never traveled in the West, were sent on trips over the company's lines in the West, so that they might become familiar with the conditions. This year the plan has been reversed. The first party was composed of agents employed at Portland, San Francisco, and Los Angeles, and a second party of agents employed at San Francisco, San Jose, Oakland, San Diego and Los Angeles. They were taken over the company's lines and through New Mexico, and Arizona, stopping off at points of interest, and then on to El Paso, Houston, Galveston and New Orleans, then from New Orleans to New York, via the Southern Pacific steamship lines, and then to the more important Atlantic Coast cities to which the Western agents are called upon to sell tickets. The entire trip comprised 32 days.

ENGLISH LOCOMOTIVE RENAMED.—An old sea captain resident in Rugby, noticing that the engine of a train on the London & North-Western Railway bore the name Dachshund, wrote to the railway company suggesting that, as an act of patriotism, the name should be changed. The engine has now been renamed Bulldog.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Satterfield, of the Interstate Commerce Commission, began a hearing at Chicago on February 2, as a part of the commission's general investigation of proposed changes in the bill of lading provisions. A hearing was held in New York the week before, and other hearings are to be held in San Francisco on February 14, at New Orleans on February 21, and Atlanta, Ga., on February 28. Among the witnesses at the Chicago hearing were F. T. Bentley, traffic manager of the Illinois Steel Company, and A. F. Mack, freight agent of the United States Steel Products Company, New York. At the hearing on Thursday it was decided to form committees of representatives of the shippers and of the carriers to present to the commission statements of the points on which the shippers and carriers agree and cannot agree, for the purpose of simplifying the investigation and defining the issues.

The Interstate Commerce Commission heard final arguments at Washington on February 3, in the case of the Business Men's League of St. Louis against 43 railroads of Illinois. The chief issue in this case is whether railroads shall maintain passenger and freight intrastate rates fixed by the state, which, by conflict with interstate rates fixed by the Interstate Commerce Commission, result in discrimination against the commercial interest of another state, or discrimination between passengers. This complaint was filed in 1914 by St. Louis business interests, charging that interstate rates fixed on a higher basis than the intrastate rates of Illinois, caused discrimination against St. Louis and in favor of Chicago and other points in Illinois. The Illinois State Public Utilities Commission at once intervened, and was followed by the attorney general "on behalf of the State of Illinois and the people of the State of Illinois," the Chicago Association of Commerce, the East St. Louis Manufacturers' Association and the Industrial Association of Keokuk, Ia. The closing arguments on behalf of the railroads were made by A. P. Humburg, commerce attorney of the Illinois Central, and C. C. Wright, general solicitor of the Chicago & North Western.

Rates From Knoxville, Tenn.

Traffic Bureau of Knoxville, Tenn., v. Cincinnati, New Orleans & Texas Pacific, et al. Opinion by Commissioner Harlan:

The present joint rates on classes and commodities from Knoxville, Tenn., to stations on the Cincinnati, New Orleans & Texas Pacific in Kentucky are found unreasonable to the extent that they exceed the rates from Chattanooga, Tenn., to the same destinations. (37 I. C. C., 687.)

Cement to Long Island Points

Opinion by Commissioner Hall:

The carriers are found to have justified proposed increased commodity rates on cement in carloads from points in the Lehigh and Nazareth districts of Pennsylvania, and from certain points in New Jersey, to destinations on the Long Island Railroad. (37 I. C. C., 694.)

Rates From Shelbyville, Ky.

Shelbyville Business Men's Association v. Louisville & Nashville et al. Opinion by Commissioner Harlan:

Upon complaint that the class rates, and many of the commodity rates, between Shelbyville, Ky., and interstate points, are unreasonable and discriminatory, because of the alleged unreasonableness and discriminatory character of the factors between Louisville, Ky., and Shelbyville, and that the rates do not conform to the long-and-short-haul provision of the fourth section of the act, the commission holds:

The rates between Louisville and Shelbyville, applying to interstate transportation, are not shown to be unreasonable, but the class rates are found to be discriminatory to the extent that they exceed the corresponding class rates between Louisville and Lexington, Ky., or between Louisville and Georgetown, Ky.

Rates on certain commodities between Louisville and Shelbyville are likewise found discriminatory to the extent that they exceed the rates between Louisville and Georgetown, Midway, Lexington or Paris, Ky. The class and commodity rates between Louisville and Shelbyville are held not to be discriminatory as compared with the rates between Louisville and Frankfort, Ky., and defendants are granted authority to continue lower class and commodity rates between these last two points than between Louisville and Shelbyville. Authority to continue lower class and commodity rates between Louisville and Georgetown, Midway, and Lexington, Ky., than between Louisville and Shelbyville, Ky., is denied. (37 I. C. C., 675.)

Rates on Salt to Oklahoma

Opinion by Commissioner Harlan:

At the present time the rates on salt in carloads from producing points in the Michigan and Ohio salt fields to stations in Oklahoma are respectively $2\frac{1}{3}$ and $3\frac{1}{3}$ cents per 100 lb. in excess of the rates from Chicago. The carriers proposed an increase of 2.04 cents in these differentials, but the commission holds that rates from the Michigan field to the destinations involved should not exceed the rates from Chicago by more than $2\frac{1}{2}$ cents, and that the rates from the Ohio producing points should not exceed those from Chicago by more than $3\frac{1}{2}$ cents. (37 I. C. C., 699.)

Rates to Paducah, Ky.

Paducah Board of Trade v. Illinois Central et al. Opinion by Commissioner Meyer:

Upon a complaint that the rates on logs and lumber to Paducah, Ky., from points in Louisiana and Arkansas are unreasonable and discriminatory as compared with the rates from the same producing territory to Cairo, Ill., the commission finds that the rates are unreasonable and discriminatory as alleged and the carriers are required to establish joint rates to Paducah, via either Cairo, Ill., or Memphis, Tenn., not in excess of the rates contemporaneously maintained to Cairo. The findings in *Paducah Board of Trade, v. Illinois Central*, 29 I. C. C., 583, are affirmed. (37 I. C. C., 719.)

Rates on Lumber Wagons

Brown-Roberts Hardware & Supply Company, Ltd., v. Alabama & Vicksburg et al. Opinion by Commissioner Harlan:

The commission finds that the rates on iron and steel lumber wagons in carloads from Quincy, Ill., where complainant's factory is located, to Alexandria and Lake Charles, La., are unreasonable. The wagons manufactured by the complainant are used by lumbermen, and are made entirely of iron and steel, consisting merely of the wheels and underframes, with four corner up-rights. The carriers are directed to revise their rates on this commodity from Quincy to points in the lumber-producing districts of Louisiana on a basis not higher than the present rates on farm wagons. (37 I. C. C., 671.)

Bituminous Coal Rates to the Southeast

Opinion by Commissioner Harlan:

Complaint is made that the rates on bituminous coal from the Tennessee, Virginia and West Virginia coal fields to southeastern destinations are unreasonable and discriminatory. The commission finds as follows:

No sufficient reason is given in favor of maintaining a rate from the Appalachia and Dante districts, comprising the southwestern Virginia fields to Spartanburg, 10 cents higher than the rate from the Coal Creek district of southeastern Tennessee. The rate from the Appalachia and Dante districts must henceforth not exceed \$1.85 (the present rate from the Coal Creek district), or whatever rate is charged from the Coal Creek district. It is similarly found that the rates from these two districts to Carolina territory, including all points on and east of the line marking the western boundary of the present 10 cent differential zone, should not exceed the rates from Coal Creek. No readjustment will be required, however, in the rates to points in the present 25 and 35-cent differential zones west of that boundary.

Concerning the relationship between the Pocahontas district of West Virginia and the Coal Creek district, the commission finds that: To points on and north of the line of the Southern Railway from Winston-Salem through Greensboro, Durham,

Raleigh, and Selma to Goldsboro, the rates from the Pocahontas district should be not less than 20 cents per ton lower than the rates from Coal Creek. To points in the territory south of this line and on and east of a line beginning at Barber Junction, and passing through Salisbury, Norwood, Wadesboro, Florence, and Lanes to Georgetown, the rates from the Pocahontas and Coal Creek fields should be the same. West of the last-mentioned line and on and east of a line extending through Charlotte, Chester, Columbia, and Denmark to Charleston, the rates from the Coal Creek district should be not less than 20 cents per ton lower than the rates from the Pocahontas district. To points west of the latter line a greater differential may properly be observed, but the necessity of establishing another differential zone is not apparent, since the record indicates that the movement of coal from the West Virginia fields is principally to the territory east of Charlotte and Columbia. The carriers, however, are called upon to express their opinions as to these findings and as to their plans for complying therewith.

In this connection the commission speaks in favor of opening a route from the Pocahontas field to points on the Southern in South Carolina near Spartanburg, over the Norfolk & Western to St. Paul, Va., thence over the Carolina, Clinchfield & Ohio. The rates to Spartanburg and nearby points over this line should not exceed \$2.35 a ton.

A rate of \$1.50 per net ton from the Pocahontas and New River districts to Lynchburg, is not found unreasonable. (37 I. C. C., 652.)

STATE COMMISSIONS

The Tennessee State Railroad Commission has dismissed the petition of Senator Luke Lea asking that the Louisville & Nashville and the Nashville, Chattanooga & St. Louis be forbidden to issue free passes. The commission holds that it has no jurisdiction over that question.

The Georgia Railroad Commission has amended its Passenger Rule No. 3 to provide for collecting a charge on baggage where it is transported on a ticket which for any reason is not used by the holder for personal transportation. If application for refund is made, "the carrier shall, if such ticket shows baggage checked, charge for the transportation of such baggage only on the total weight thereof, not exceeding double the excess baggage rates per 100 lb.; and the difference between this sum and the original price paid for the passenger ticket, plus any excess baggage charge made, shall be refunded."

PERSONNEL OF COMMISSIONS

The nomination of Travis H. Whitney and Charles S. Hervey to be members of the New York State Public Service Commission, First district, was sent by the governor of New York to the Senate on February 7. Mr. Whitney is nominated for the term of five years, and Mr. Hervey for one year to fill out an unexpired term. The commission for the first district now consists of five members, all of whom have been appointed by the present governor. They are Oscar S. Straus, chairman; William Hayward, Henry W. Hodge, Charles S. Hervey and Travis H. Whitney.

COURT NEWS

At Atlanta, Ga., February 5, by a decision of Judge A. W. Fite, the Louisville & Nashville was enjoined from publishing notice of intention to build a railroad from Cartersville to Marietta, and the Atlanta, Knoxville & Northern is similarly restrained. The injunction was asked for by the State of Georgia, owner of the Western & Atlantic, on the ground that the proposed new road would parallel the state road and might impair its value.

Unloading Timber—Assumption of Risk

A railroad employee was unloading from a car heavy timbers, 15 ft. long and 14 in. by 8 in. at the end, while there was snow on the ground. He and his fellow workmen complained of the danger of the work, but were required by the foreman to continue. After a number of the timbers had been unloaded, one,

because of the slippery condition of the slanting pieces from the car to the ground, fell and injured the employee, who sued the company. He contended that the place of work was unsafe because the ground, which was rough, was covered with snow that concealed obstructions. He also claimed that, having his mind on his work, he did not know that the ends of the timbers which had been unloaded were piled so close to him that the piece causing the injury protruded so far that it did not give him sufficient room, and that he was relying entirely on the foreman. The Kentucky Court of Appeals held that as the plaintiff and his fellow servants had objected to the nature of the work, he assumed the risk of injury by continuing at it. Every one is charged with knowing what is before his eyes, and every one knows that if a timber is being lowered from a car on slanting pieces, the timber will fall of its own weight, if not properly held; and if the slanting pieces have snow on them, the timber will be likely to slip.—*Isaacs v. L. & N. (Ky.)* 180 S. W. 345.

Using Tracks as Highways

In an action for the death of a pedestrian struck by a locomotive coming from the rear while traveling along the track of a fenced railroad, it was alleged that the track for about two miles was a public highway for pedestrians, so used by large numbers daily with the acquiescence, and at the invitation of the company, and that the locomotive had no headlight and was run at a dangerous speed. On appeal from a judgment for the plaintiff, the Minnesota Supreme Court holds that this general practice of trespassing on inclosed railroad rights of way does not ripen into a license. The absence of all benefit to the railroad and the continual presence of danger forbids the inference of implied consent. Deceased was so clearly a trespasser that the trial court should have ordered judgment for the defendant. No jury would be justified in holding that the engineer was required, on a cold and stormy night, to anticipate the presence of persons on the track. Cases relating to situations within cities, villages or congested neighborhoods are different from cases where tracks run through ordinary agricultural districts. In Arkansas and Tennessee engineers are by statute required to keep a lookout for trespassers and others, and the decisions in North Carolina and Texas tend in the same direction, so that authorities cited from these states were not helpful. In any event, walking on the track at such a time and place was such contributory negligence that a verdict for the plaintiff could not be permitted to stand.—*Hanks v. G. N. (Minn.)* 154 N. W. 1088.

Crossing Accident—Negligence of Motorist

A motorist drove his car on to a blind and dangerous crossing notwithstanding the flagman was in the street waving a white flag, and was struck by the train and killed. In an action for his death, the Connecticut Supreme Court of Errors held that he was guilty of contributory negligence as a matter of law. It was argued that the railroad was negligent because the flagman was waving a white flag and not a red one, and did not stand exactly in the middle of the street; but the court denies this claim, holding that the road had done all the public utilities commission required for the warning of travelers. The fact that the man was flagging the train and not travelers was not negligence, for in either case travelers would be warned by his action.—*Borglum v. N. Y., N. H. & H. (Conn.)*, 96 Atl. 174.

Freight Charges a "Liquidated" Demand

The Texas statutes provide that if the cause of action is liquidated and proved by an instrument in writing, judgment by default may be rendered; otherwise the court must hear evidence. A railroad sued a lumber company to recover freight charges. A Texas statute requires a written receipt or bill of lading to be issued by the carrier to the shipper, and the classification of freight fixed by the railroad commission is made conclusive between carrier and shipper. The railroad's petition alleged a contract of shipment, and that the freight charges were legally charged and fixed. The Texas Court of Civil Appeals held that the road's cause of action was for a certain or "liquidated" demand, which is one agreed on by the parties or fixed by operation of law, and that a default judgment could be entered thereon without the court's taking proof.—*Western Lumber Co. v. Chicago, R. I. & Gulf (Tex.)* 180 S. W. 644.

Judgment Reversed as Against Weight of Evidence

The plaintiff in a suit against a railroad company for injuries testified that he stumbled on a stairway while going from the ticket office under the tracks to a platform to take a train, and that there was no sufficient light in the subway. His testimony was uncorroborated and was contradicted in the most positive manner by nine witnesses, who apparently were credible, disinterested, and in no way responsible for the accident, and who testified that the plaintiff, half an hour before he claimed to have fallen, was lying intoxicated on a platform over 200 feet from the subway stairs, and it appeared that about that time he was taken from the station to a hospital in the police station for surgical treatment, and then placed under arrest for intoxication. It was held by the Connecticut Supreme Court of Errors that, while deference should be given to the opinion of the trial judge who saw the witnesses and heard them testify, the preponderance of the evidence against the plaintiff was so great as to clearly warrant the conclusion that the verdict was the product of misapprehension, prejudice or partiality on the part of the jury.—*Baril v. N. Y., N. H. & H. (Conn.)* 96 Atl. 164.

Income Tax Provisions of Tariff Act Held Valid

A stockholder of the Union Pacific sought to enjoin the company from complying with the income tax provisions of the tariff act of October 3, 1913, charging the repugnancy of the statute to the Sixteenth Amendment, under the more immediate sanction of which the statute was adopted. The United States Supreme Court refused to grant the injunction, stating that comprehensively surveying all the contentions relied upon, it could not "escape the conclusion that they all rest upon the mistaken theory that although there be differences between the subjects taxed, to differently tax them transcends the limit of taxation and amounts to a want of due process, and that where a tax levied is believed by one who resists its enforcement to be wanting in wisdom and to work injustice, from that fact in the nature of things there arises a want of due process of law and a resulting authority in the judiciary to exceed its powers and correct what are assumed to be mistaken or unwise exertions by the legislative authority of its lawful powers, even although there be no semblance of warrant in the Constitution for so doing."—*Brushaber v. Union Pacific*. Decided January 24, 1916.

Information to Passengers as to Making Connection

A woman traveling from Marshall, Tex., over the Texas & Pacific, inquired if the train, No. 105, would go through to Palestine on the International & Great Northern. The ticket agent said that when the train was late passengers would have to stop at Longview over night, the train arriving there between 5 P. M. and 6 P. M.; and he told her to ask the man at the train if the train would go through. She was told by the porter and brakeman that it would; but the connection was not made, and at Longview she and her children got wet by rain and were made sick. She had not enough money to pay her hotel bill, and was subjected to the humiliation of having to ask for credit. She sued the Texas & Pacific and got a verdict of \$250. This was reversed on appeal by the Texas Court of Civil Appeals and judgment rendered for the railroad on the ground that the trainmen had no authority to represent to the plaintiff that she would not have to stay in Longview all night. Furnishing information about the movement of trains on other lines was outside the scope of the duties of the porter and brakemen.—*Texas & Pacific v. Conway (Tex.)*, 180 S. W. 666.

Filed Tariff on Iron Ore Rules

The Dayton Coal & Iron Company sought to enjoin the Southern and other roads from collecting 70 cents a ton on iron ore shipped from Cartersville and other points in Georgia to Dayton, Tennessee, instead of 60 cents as the Dayton Company contended the rate should be. The difference amounted to \$4,933. The United States Supreme Court agrees with the Tennessee Supreme Court that the 70-cent rate (shown in the tariff) was the only legal rate in force at the time of the shipments; that it was filed with the Interstate Commerce Commission on February 2, 1907, to take effect on March 5, 1907; that it was thus filed by the Nashville, Chattanooga & St. Louis and duly received and stamped by the Southern as the connecting carrier, and that the Southern concurred in the tariff by receiving freight

under the rates shown and making settlements under it. This made the rate a joint one, in accordance with the rulings of the Interstate Commerce Commission at that time, and under the Interstate Commerce Act there could be no departure from this published rate.—*Dayton Coal & Iron Co. v. C. N. O. & T. P.* Decided December 20, 1915.

Participation by Caretaker of Stock in Violation of Rest Law

An action was brought to recover damages to a shipment of live stock from Atkinson, Neb., to Chicago, by reason of a failure to comply with the rest, water and food act. It was alleged that sixty-seven head of cattle were kept in the cars for fifty-four hours, causing a shrinkage in weight and a loss of \$659. The Nebraska Supreme Court found that the cattle were confined for more than thirty-six hours, but held that the plaintiff was in no position to recover damages. He accompanied the stock as caretaker under a written contract with the railroad, whereby he assumed the duty of feeding, watering, and caring for the stock in transit. He made no request of the company to unload the stock for feeding and watering, but testified on the trial that the cattle were fed in racks provided for that purpose, and that he preferred to have them taken through as rapidly as possible without unloading. Where the shipper, as a caretaker, participates with the company in the course pursued, he should not be permitted to recover damages thus occasioned to which he himself contributed.—*Fluckiger v. C. & N. W.* (Neb.), 154 N. W., 865.

Duty to Through Passenger at Junction

J. T. Bigger, a passenger on the Texas & Pacific, sued for personal injuries caused by being compelled to leave a Texas & Pacific train at Longview in the midst of a cloudburst, becoming so drenched that he became seriously ill. After the action was begun he died, and it was continued by his widow and six children. The jury awarded damages of \$15,250, apportioning the amount among the plaintiffs. There was on the train (on which Bigger was a through passenger from Owensboro to San Antonio) a car which went to San Antonio, and the jury found that he had not been told of this, though the company asserted he had, and that he disregarded the information. It is also claimed that Bigger's death was the direct and proximate result of hopeless tubercular infection. The United States Supreme Court, however, holds that the jury's verdict is conclusive as to the condition of his health and as to the expectancy from his life. The railroad also urged that there were sheds and other buildings near for shelter and that Bigger should have changed his wet clothes at a hotel in Longview or secured a Pullman sleeper. The Supreme Court holds that the same degree of care was necessary to be observed by the railroad after he left the train at Longview, as was to be observed in his transportation, and an instruction to the jury to that effect was proper. It therefore affirmed the judgment for the plaintiffs. The chief justice, Mr. Justice Van Devanter, and Mr. Justice McReynolds dissented, being of the opinion that the trial court's instructions laid upon the railroad a heavier duty than the law recognizes.—*Texas & Pacific v. Bigger.* Decided December 13, 1915.

Injury to Passenger by Drawbar Failure—Air Brake—Meddling Passengers

An excursion train had all its sixteen coaches connected with the automatic air-brake system. The end of the air pipe line was hooked over the railing around the platform of the rear car. The rear door of the last coach was locked, but one of a group of young men found he had a key which fitted the door; he opened it, and all went out on the platform. One of them opened the angle-cock and set the brakes in emergency, breaking the eyes out of a drawbar of the second coach of the train. The train parted just as a passenger was stepping across, and he was killed. In an action brought against the railroad it was claimed that the drawbar which broke was defective, in that it had become crystallized, and that the broken surface showed certain small holes or pockets. The evidence showed that crystallization is a condition to be expected in steel which has been subjected to continuous pressing stress. The holes were caused by air or sand when it was molded. It was not shown that the holes in this drawbar were more numerous than or different

from those generally to be found in steel castings of the same character. The evidence did not show that the drawbar was of a size, strength or appearance different from other drawbars. If it was crystallized, this was a latent defect which would not have been discovered by inspection. The Supreme Court of the State of Washington therefore held that as regards the drawbar the evidence failed to show negligence.

It was next claimed that there was negligence because the safety chains between the cars were not in use; but it appeared "that anything that would break both eyes out of the coupler would be sufficient to more than break the safety chains."

It was also claimed that it was negligence to have the angle-cock exposed over the railing of the rear platform. To this contention there were two answers. One was that the brakeman, by locking the door, had exercised all necessary precaution to prevent passengers from being on that platform. The other was the general principle of law, often asserted by the courts, that a railroad is not bound to anticipate that a passenger will intentionally meddle or interfere with the machinery of the train.

There was no liability on the theory of a condition of rowdiness existing on the train; There was merely playful conduct among some of the picnickers, which did not appear to have attracted the attention of anyone till the accident occurred. Judgment of dismissal was affirmed.—*Anderson v. Northern Pacific* (Wash.), 152 Pac., 1001.

Liability for First Aid Emergency Service—Station Master's Authority to Employ Physician

A trespasser struck by a train was, by the direction of the railroad's superintendent, picked up by the conductor of another train and taken to Worthington, Ind.; the company's surgeon there rendered what assistance he could, and, there being no place at Worthington to leave the man, he was taken to Vincennes. The station agent there engaged a doctor to treat him. His right leg and left foot were found to require amputation. The doctor, with surgical aid, performed the operation. He afterwards sued the railroad for these and subsequent services to the patient. It has frequently been held that, while on ordinary occasions, and at times when a superior officer was within reach, a station master could not bind the railroad to pay for medical services, still, when an employee is injured by a train, and immediate attention is necessary to save life or prevent great injury, when the highest officer present engages a physician, the emergency has created in him authority to bind the company to pay for such services as the emergency demands, and no more. This rule has also been applied where the injured person was a passenger, or even a trespasser. The Appellate Court of Indiana applied the rule in the present case, and held that if the condition of the patient and the emergency made additional surgical services and medical aid absolutely necessary, the doctor could recover for the services of the surgeons called in as well as for his own.

But if the railroad notified the doctor that it would not be liable for any further services or attention rendered the injured person, it was not liable to him for any services undertaken after such notice. The station master's authority to bind the company expired when he came into communication with his superior officers.

While the rule is not altogether the same in all states, the Indiana courts hold that an emergency exists where the exigencies are of so pressing a nature that immediate action must be taken to relieve the injured person from his present suffering, or preserve his life; and when such services have been rendered the emergency authorizing the original employment ceases to exist, and there is no further liability for medical services unless such further liability arises by reason of some additional contractual relation between the parties. It is the inability of the injured party to obtain medical aid for himself that gives rise to the emergency. What constituted first aid emergency services was, in the circumstances, a question of fact for the jury.—*Vandalia v. Bryan* (Ind.), 110 N. W. 218.

Liability for Result of Ticket Agent's Mistake

Miss I. H. Gerety had a July, 1914, commutation ticket on the New York & New Jersey, which she handed to the ticket agent with a \$10 bill and asked him for her August ticket. The agent returned to her the July ticket, the change of the \$10

bill and the August ticket, upon which she traveled until August 29, when the ticket was taken up by one of the company's conductors, who discovered that the ticket read "Mr." I. H. Gerety. She brought an action against the company, not for the taking up of the ticket, or for refusal to permit her to ride thereon, but for damages for the failing to deliver to her the ticket for which she had asked. For this reason the New Jersey Supreme Court held that the action was not within the decision in the case of *Shelton v. Erie* (1907), 73 N. J. Law 558, where it was held that the expulsion from a train of a person who refuses to pay to the conductor any fare other than the tender of a limited ticket which on its face has expired, is not actionable, though the person has paid for such ticket the full rate for which he should have got an unlimited ticket, and though he has told this to the conductor. It was rather within the illustrative dictum in that case to the effect that the obligations of the company for its agent's acts are that he should deliver to passengers the tickets for which they ask and pay; if this is not done, whether the fault be that of the agent or the company, this obligation is broken, and the company is liable for the damages that result therefrom. The court therefore affirmed judgment for the plaintiff. The amount of damages awarded is not stated in the opinion. They appear to have been for the indignity and mental distress incident to the occurrence that resulted from the mistake of the ticket agent.—*Gerety v. N. Y. & N. J. (N. J.)*, 95 Atl. 733.

Shippers Must Bear Cost of Bulkheads

Shippers of grain and produce over the Lehigh Valley road from points in the state of New York sued the company in the New York state courts without first resorting to the Interstate Commerce Commission for the cost of material used by them in the construction of inside doors or bulkheads in some 200 cars used by them after August, 1906. Prior to that time the railroad supplied lumber without charge and the shippers constructed these necessary temporary fittings. It then discontinued the practice and refused to supply either materials or completely equipped cars. The New York Court of Appeals held that the common law imposed on the railroads the duty of furnishing cars equipped with inside doors or bulkheads for transporting grain or provisions in bulk and unless local or federal statutes had established different rules, the plaintiffs were entitled to recover. Having considered the statutes it concluded the local act created no bar to recovery on account of intrastate shipments, but that Congress had assumed such control over interstate shipments as to deprive the state courts of power to consider claims arising out of them. 208 N. Y., 312.

This decision has now been affirmed by the United States Supreme Court, which held that the case presented a problem which directly concerned rate-making and was peculiarly administrative; and the preservation of uniformity and prevention of discrimination rendered essential some appropriate ruling by the commission before it could be submitted to a court. Before this proceeding was begun the commission ruled: "A carrier may not lawfully reimburse shippers for the expense incurred in attaching grain doors to box cars unless expressly so provided in its tariff" (Conference Ruling No. 78). In *National Lumber Dealers' Association v. Atlantic Coast Line, et al.*, 14 I. C. C., 154 (1908) after much consideration the commission refused to order carriers either to furnish flat cars equipped in all respects for transporting lumber or grant allowances for cost incurred by shippers in connection therewith. In *New York State Shippers' Protective Assoc. v. New York Central*, 30 I. C. C., 437 (1914), the regulations and practices of railroads in western New York with respect to car fittings used in bulk transportation of grain and produce were challenged. The shippers claimed "it is the carrier's duty to supply cars at all seasons of the year fully equipped for the safe transportation of grain, potatoes and other produce in bulk without further fittings; or, that if a car be tendered the shipper which cannot safely be used for such commodities, in view of their nature or of the condition of the weather, it is the carrier's duty to furnish, or to pay for, all materials and labor necessary to render the car reasonably safe." This was denied by the commission. The opinions in these cases, the court said, strikingly indicated the complicated administrative problem involved.—*Loomis v. Lehigh Valley*. Decided January 24, 1916.

Railway Officers

Executive, Financial, Legal and Accounting

L. G. Scott, auditor of the Texas & Pacific, has been appointed general auditor of the Wabash, with headquarters at St. Louis, Mo.

D. B. Heiserman, general counsel of the Pennsylvania Lines west of Pittsburgh, has had his jurisdiction extended over the Vandalia, vice J. G. Williams, who retired under the pension rules on February 1. D. P. Williams, assistant counsel of the Vandalia, has been appointed general solicitor with headquarters at St. Louis, Mo.

Alfred P. Thom, general counsel of the Southern Railway at Washington, D. C., in the general railroad interest, having accepted the position of counsel of the railway executive advisory committee, has, at his own request, been temporarily relieved of certain duties of his office for the Southern. Effective February 1, the organization of the law department was readjusted and the duties of general counsel distributed as follows: Francis Lynde Stetson, general counsel at New York, with general advisory and active duties as assigned by the board of directors or the president; Alfred P. Thom, general counsel at Washington, D. C., with general advisory and active duties as assigned by the president; Alexander P. Humphrey, general counsel at Louisville, Ky., in charge of the law department of the Western district, and L. E. Jeffries, general counsel at Washington, D. C., in charge of the law department, Northern, Eastern, Middle and Southern districts.

Ralph T. Damon, who has been appointed general claim agent of the Boston & Maine, with headquarters at Boston, Mass., as has already been announced in these columns, was born on

March 15, 1874, at Charlotte, Maine. He was educated in the common schools and at Shaw Business College. On October 1, 1896, he began railway work as a clerk in the accounting department of the Boston & Maine, and in April, 1901, was appointed chief clerk in the claim department. One year later he was transferred to the division claim office at Concord, N. H., as assistant claim agent, and in February, 1904, he returned to Boston as claim agent of the Terminal and Portland divisions. He remained in this position until November, 1906, when he



R. T. Damon

was appointed claim agent in charge of the Concord office, which position he held at the time of his recent appointment as general claim agent of the same road, as above noted.

Operating

A. G. Donovan has been appointed general manager of the Ft. Worth Belt, vice J. A. Stafford.

L. S. Roattie has been appointed chief dispatcher of the Chicago Great Western, vice J. M. Reines, promoted.

Thomas Rodger has been appointed superintendent of telegraphs of the Grand Trunk, with office at Montreal, Que.

C. B. Lucas, traffic manager of the Valdosta, Moultrie & Western at Valdosta, Ga., has been appointed assistant general manager, and his former position has been abolished.

Ernest C. Wills has been appointed assistant to the general manager of the Missouri Pacific-St. Louis, Iron Mountain & Southern, with office at St. Louis, Mo. Mr. Wills entered railway service in 1889 as a clerk in the office of the division superintendent of the Missouri Pacific at Atchison, Kan. He remained at that point, filling various positions, until 1903, when he was transferred to Wichita, Kan., as chief clerk to the division superintendent in that city. In 1907 he was promoted to trainmaster, with headquarters at Coffeyville, Kan., and in 1909 was transferred to the general manager's office at St. Louis, where he has remained up to the present time.

L. S. Bourne, whose appointment as division superintendent of the Galveston, Harrisburg & San Antonio, with office at El Paso, Tex., has been announced, was born at Wytheville, Va., in April, 1875. He received a high school education, and entered railway service in September, 1891, as a section laborer for the Kansas City North-western, now part of the Missouri Pacific. He subsequently became telegraph operator and storekeeper for the same road, and in September, 1893, entered the employ of the Chicago Great Western, serving consecutively as operator, dispatcher, chief dispatcher and trainmaster on various divisions. From May, 1907, to May, 1909, he was superintendent of the Torreon and Mexico divisions of the Mexican Central; from May, 1909, to May, 1910, he was chief clerk to general superintendent of the Northern Pacific at Livingston, Mont. He was general superintendent of the Tennessee Central from May, 1910, to November, 1912, when he became trainmaster of the Pere Marquette, a position he retained until February, 1913. From February, 1913, to January 1, 1916, he was inspector of transportation for the Sunset-Central Lines and assistant superintendent of the Houston & Texas Central, with office at Austin, Tex.

C. J. Kavanagh, whose appointment as superintendent of the Chicago Junction has been announced, was born at Bradford, Pa., on September 7, 1877. He was educated in the public

schools of Washington, Pa., and started his railroad career as call boy for the Lake Erie & Western at Lima, Ohio, in 1893. He remained in the service of that company as yard clerk, switchman, switch foreman, brakeman, conductor, general yardmaster and passenger conductor, until 1907, when he resigned to become general yardmaster of the Cincinnati, Hamilton & Dayton at Lima. In 1910 he left Lima to become general yardmaster of the Chicago Great Western, and on December 18, 1912, was promoted to trainmaster of the same road, with office at Chicago, Ill. On



C. J. Kavanagh

February 1, 1916, he was appointed superintendent of the Chicago Junction, with office at the Union Stock Yards, Chicago.

Traffic

M. J. Shader has been appointed general agent of the Ft. Dodge, Des Moines & Southern, with office at Ft. Dodge, Iowa.

H. A. Crow, city passenger agent of the Chicago & Alton at Chicago, Ill., has been appointed general agent of the passenger department, with office at St. Louis, Mo.

Andrew K. Morris, assistant coal traffic manager of the Erie, at New York, has been appointed coal freight agent, and Charles H. Horrell, contracting agent of coal and coke traffic at Chicago, has been appointed assistant coal freight agent. Both have headquarters at New York.

J. B. Stewart, general freight and passenger agent of the New York, Ontario & Western at New York, has been appointed traffic manager. G. L. Robinson, assistant general passenger

agent at New York, has been appointed general passenger agent, and R. F. Waterhouse, chief of the tariff bureau, has been appointed general freight agent. All with offices at New York.

The Belt Railway of Chicago has established outside agencies at Pittsburgh, Pa., Kansas City, Mo., and Minneapolis, Minn. H. W. Wheeler, assistant general freight agent at Chicago, has been appointed general eastern agent, with headquarters at Pittsburgh. W. B. Wheeler has been appointed commercial agent at Kansas City, and A. C. Burgess has been appointed commercial agent at Minneapolis.

J. W. Perrin, whose appointment as assistant freight traffic manager of the Atlantic Coast Line, with headquarters at Wilmington, N. C., has already been announced in these columns, was born on March 22, 1869, at Abbeville, S. C., and was educated at South Carolina Military Academy. He began railway work on October 1, 1891, with the Charleston, Sumter & Northern, now a part of the Atlantic Coast Line, and from December, 1894 to December, 1897, served consecutively as claim clerk and rate clerk on the Cape Fear & Yadkin Valley. He then entered the service of the Atlantic Coast Line as rate clerk in the freight traffic department. In 1900 he was appointed chief clerk, and two years later became assistant general freight agent. In 1906, he was appointed general freight agent of the first division, and now becomes assistant freight traffic manager of the same road.

B. F. Horner, general passenger agent of the New York, Chicago & St. Louis, who retired from service on February 1, was born at Roscoe, Coshocton county, Ohio, on January 20, 1845. He entered railway service on March 28, 1863, as a brakeman; from 1864 to 1868 he was a passenger conductor, and from August, 1868, to October, 1877, ticket agent for the Pittsburgh, Columbus & Cincinnati, the Pittsburgh, Ft. Wayne & Chicago, the Cleveland & Pittsburgh, and the Erie & Pittsburgh at the Union Passenger Station at Pittsburgh, Pa. From October, 1877, to May, 1878, he was central passenger agent of the International & Great Northern; from May, 1878, to October 1, 1882, city passenger and ticket agent of the Pennsylvania at Chicago, Ill.; and from October, 1882, to March, 1883, western passenger agent for the New York, Chicago & St. Louis. In March, 1883, he was appointed general passenger agent of the same railroad and continued to hold that position up to the time of his recent retirement.

Engineering and Rolling Stock

D. A. Graham has been appointed resident engineer of the Canadian Northern Pacific, with office at Vancouver, B. C.

Philip H. Conniff has been appointed assistant superintendent of motive power and machinery, of the Florida East Coast, with headquarters at St. Augustine, Fla.

G. D. Swingley has been appointed supervisor of bridges and buildings for the San Antonio & Arkansas Pass, with office at Yoakum, Tex., vice C. E. Apple, resigned.

E. J. Harris has been appointed master mechanic of the Missouri division of the Chicago, Rock Island & Pacific, vice P. Linthicum, acting master mechanic, transferred.

B. P. Johnson has been appointed master mechanic of the Seattle division of the Northern Pacific, with headquarters at Seattle, Wash., vice C. S. Larrison, deceased.

A. C. Shields has been appointed division engineer of the Missouri division of the Chicago, Rock Island & Pacific, with office at Trenton, Mo., vice F. E. Watson, given a leave of absence.

W. L. Connors, signal supervisor of the Buffalo, Rochester & Pittsburgh, at Warsaw, N. Y., has been promoted to assistant signal engineer, with headquarters at Du Bois, Pa., succeeding L. R. Byram and J. H. Moore, signal supervisor at East Salamanca, N. Y., has been promoted to signal supervisor at Warsaw.

P. J. McAndrews, roadmaster on the Chicago & North Western, has been transferred from Belle Plaine, Iowa, to Sterling, Ill., to succeed L. C. Ryan, resigned to become sales manager for the Positive Rail Anchor Company. F. E. Crabbs, roadmaster at Manlius, Ill., has been transferred to Belle Plaine, Iowa, vice Mr. McAndrews. K. O. Eck has been appointed roadmaster to succeed F. E. Crabbs at Manlius, Ill.

T. H. Portel has been appointed acting roadmaster for the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, vice T. H. O'Brien, temporarily assigned to other duties.

P. Desmond has been appointed roadmaster with headquarters at Atlantic, Iowa, vice J. B. Pugh, transferred. J. B. Pugh has been appointed roadmaster with office at Iowa City, Iowa, vice A. E. Donnelly, granted a leave of absence. George H. Buseman has been appointed roadmaster with headquarters at Pipestone, Minn., vice P. J. Desmond, transferred.

Purchasing

Russell L. Underwood has been appointed storekeeper of the Cincinnati Northern, with office at Van Wert, Ohio, vice F. P. Clark, resigned to engage in private business.

G. W. Conway has been appointed general storekeeper of the Louisville & Nashville, with office at Louisville, Ky., succeeding S. G. Conner, deceased, and Edwin Meyers has been appointed assistant general storekeeper.

OBITUARY

Michael McDonough, supervisor for the Pennsylvania Lines West at Mt. Vernon, Ohio, died on February 1, aged 69.

Smith G. Conner, general storekeeper of the Louisville & Nashville at Louisville, Ky., since 1909, died recently after a very short illness.

Sir Charles Rivers Wilson, formerly for several years president of the Grand Trunk Railway of Canada, died in London, England, February 9, at the age of 85.

George A. Hancock, formerly general superintendent of motive power of the St. Louis & San Francisco, died suddenly on February 8, at Los Angeles, Cal., where he resided during the winter of each year. He retired from the service of the Frisco in 1912.

Eugene H. Hinton, chairman of the Southeastern Freight Association, with office at Atlanta, Ga., died on February 6 in a hospital in Atlanta. He was born on December 5, 1853, at Livingston, Madison county, Miss., and began railway work in 1879. He subsequently served in the traffic department of various roads, and in June, 1905, became chairman of the Southeastern Freight Association.

Adam R. Creelman, formerly from 1905 to 1913 general counsel of the Canadian Pacific, with office at Montreal, Que., died on February 6 at his home in that city. He was born at Richibucto, N. B., and was educated in the grammar schools of his native town and at the Presbyterian Academy, Chatham, N. B. In 1901 he became a solicitor on the Canadian Pacific, and later was made chief solicitor, then from 1905 to July, 1913, served as general counsel. In 1910 he was elected a director of the same road.

Alexander Hamilton, first vice-president and general counsel of the Atlantic Coast Line, with office at Petersburg, Va., died on February 4, at his home in that city. He was born on March 18, 1851, at Williamsborough, N. C., and graduated in 1871, from the Virginia Military Institute. In June, 1873, he graduated from Washington and Lee University with the degree of LL.B., and the same year was admitted to the bar. He practised law in Richmond, Va., and later served as chief counsel in Virginia and vice-president of various companies which in 1900 became part of the Atlantic Coast Line. He then became second vice-president and later first vice-president of the consolidated company. Since 1906 he was also general counsel of the same road. Mr. Hamilton was also a director of the Louisville & Nashville.

E. J. Robinson, valuation engineer of the Chicago, Burlington & Quincy at Chicago, died of acute peritonitis on February 8. Mr. Robinson was born at Nunda, N. Y., on June 8, 1863, and graduated from the University of Nebraska in civil engineering in 1884. He entered the service of the Burlington in the summer of 1883. After graduation he returned to the road, and till 1896 was engaged in construction work, most of the time as resident engineer. From 1896 to 1903 he was mining engineer at Deadwood, S. D. Then for a year he was superintendent of the Federal Lead Company at Flat River, Mo. From April, 1905, to December 31, 1907, he was engaged in construction work on the Burlington as resident engineer. In 1908 he was location engineer of the Big Horn Basin Development Company at Wiley, Wyo. From 1909 to 1914 he was resident engineer of the Burlington, in charge of valuation work, and for the last two years was valuation engineer, with office at Chicago.

Equipment and Supplies

LOCOMOTIVES

THE NEVADA NORTHERN has issued an inquiry for a locomotive.

THE CAROLINA, CLINCHFIELD & OHIO is in the market for 6 Mallet type locomotives.

THE COLUMBIA & NEHALEM RIVER has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

THE LITTLE RIVER RAILROAD, Townsend, Tenn., has ordered one 85-ton Shay locomotive from the Lima Locomotive Corporation.

THE SHEVLIN-HIXON COMPANY, Minneapolis, Minn., has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE REPUBLIC IRON & STEEL COMPANY, Youngstown, Ohio, has ordered 2 Mogul type locomotives from the Baldwin Locomotive Works.

THE WESTINGHOUSE MACHINE COMPANY, Pittsburgh, Pa., has ordered one four-wheel switching locomotive from the Baldwin Locomotive Works.

THE NEW YORK CENTRAL, briefly mentioned in last week's issue as contemplating the purchase of locomotives, has issued inquiries for 50 Mikado and 25 switching locomotives.

THE NEW YORK, NEW HAVEN & HARTFORD, reported in the *Railway Age Gazette* of January 28 as contemplating the purchase of Pacific type locomotives, has issued an inquiry for 50 locomotives of that type.

THE CUBA RAILROAD, reported in the *Railway Age Gazette* of December 17 as having ordered 10 superheater ten-wheel locomotives from the American Locomotive Company, has since increased this order to 30 locomotives.

THE DETROIT TERMINAL has ordered 3 superheater six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 21 by 28-in. cylinders, 57-in. driving wheels, and a total weight in working order of 172,000 lb.

THE DENVER & SALT LAKE has ordered 4 Mallet (2-6-0) type and 2 Mikado locomotives from the American Locomotive Company. The Mallet type locomotives will have 21 and 33½ by 32-in. cylinders, 55-in. driving wheels and a total weight in working order of 361,000 lb. The Mikado locomotives will have 26 by 30-in. cylinders, 55-in. driving wheels, and a total weight in working order of 305,000 lb. All 6 locomotives will be equipped with superheaters.

FREIGHT CARS

MORRIS & Co., Chicago, is contemplating the purchase of refrigerator cars.

THE UNION CARPIDE COMPANY, Peoples Gas building, Chicago, has ordered 4 hopper cars from the Pressed Steel Car Company.

THE BALTIMORE & OHIO, reported last week as being in the market for 500 refrigerator cars, will build these cars in its own shops.

THE CANADIAN PACIFIC is building 700 box cars in its Angus shops in addition to the 800 box cars mentioned in the *Railway Age Gazette* of December 10.

THE AMERICAN STEEL & WIRE COMPANY, reported in the *Railway Age Gazette* as inquiring for 30 gondola cars, has ordered these cars from the Ralston Steel Car Company.

THE ILLINOIS CENTRAL has withdrawn its inquiries for 300 hopper and 400 work cars, but is expected to inquire for 700 general service cars. It is also in the market for 300 stock and 300 drop bottom gondola cars.

THE LAKE ERIE, FRANKLIN & CLARION has ordered 50 steel hopper cars from the Standard Steel Car Company.

THE NEW YORK CENTRAL is reported to have issued an inquiry for 1,000 steel hopper cars.

PASSENGER CARS

THE LEHIGH VALLEY has issued inquiries for 2 dining cars and one private car.

THE UNION PACIFIC has issued an inquiry for 5 combination baggage and mail cars.

THE NEW YORK CENTRAL is understood to be preparing specifications for 25 multiple-unit coaches.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS, reported in the issue of January 28 as being in the market for 2 postal cars, is said to have ordered these cars from the American Car & Foundry Company.

THE ERIE, reported in the *Railway Age Gazette* of January 14 as being in the market for 5 coaches and one baggage car, has ordered these cars from the Pressed Steel Car Company. These cars will be of the unit side frame construction employed by L. B. Stilwell, consulting engineers, and are for through service.

THE ILLINOIS CENTRAL was reported in the *Railway Age Gazette* of January 21 as having issued inquiries for 94 passenger cars. It has now changed these inquiries so that instead of the 4 mail cars and 6 mail and baggage cars included in the total, there are: One 60-ft. 9½-in. postal car; 3 combination baggage and mail cars with 40-ft. mail and 30-ft. baggage compartments, and 6 combination baggage and mail cars with 30-ft. mail and 40-ft. baggage compartments.

IRON AND STEEL

THE LITTLE RIVER RAILROAD, Townsend, Tenn., has ordered 200 tons of 60-lb. relaying rail.

THE GREAT NORTHERN is inquiring for various tonnages for its last half of 1916 requirements of car axles, trailer and driving axles, crank pins, piston rods, shapes and plates, angle bars, bolts and spikes.

MACHINERY AND TOOLS

THE LITTLE RIVER RAILROAD, Townsend, Tenn., has ordered one ¾ yd. steam shovel from the Marion Steam Shovel Company.

MISCELLANEOUS

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has given the Roberts & Schaefer Company, Chicago, a contract for a "RandS" gravity sand plant, using the Beamer patent steam sand dryer. This plant will be built adjacent to the large reinforced concrete coaling station now under construction for this company at Cowan, Tenn.

THE DULUTH, MISSABE & NORTHERN has awarded a contract to the Roberts & Schaefer Company, Chicago, for a large 1,000-ton capacity reinforced concrete automatic electric locomotive coaling plant, using a standard counterbalanced bucket elevating equipment for immediate installation at Proctor, Minn. A contract has also been awarded for a fireproof "RandS" gravity sand plant, using the Beamer patent steam sand dryer for the drying of locomotive sand.

EXTENSION OF SIAMESE SOUTHERN RAILWAY.—Up to March 31, 1915, the total length of the Siamese Southern with its branches open to traffic was 389 miles, of which 120 miles was opened during the year ending on that date, and as the total length of the line with its branches will be 740 miles, there remained yet 351 miles to be completed. The line when completed will shorten the mail service to Europe via Trang and Penang by three or four days, and the journey from Penang to Bangkok will occupy two and one-half days only, against six to eight days now taken by sea. The area traversed has now a population of only about 1,500,000, but a great influx of people is expected with the opening up of the large tracts of country which are suitable for cattle grazing, rice cultivation, rubber and coconut plantations, and other tropical products; and the mining interest includes tin, coal, gold, wolfram and other minerals. The railway will greatly facilitate the working of these hitherto more or less inaccessible resources.

Supply Trade News

Charles A. Liddle, newly elected vice-president, and D. A. Crawford, newly elected treasurer of the Haskell & Barker Car Company, have also been elected directors of the company.

The Osgood Company, manufacturer of excavating machinery, has arranged with the firm of Copeland & Klingel, 1124 Metropolitan Life building, Minneapolis, Minn., to represent it in the Northwest.

Crawford A. Duntley has been elected president of the Duntley Products Sales Company, of Chicago, and Robert E. Hogan has been appointed to a position in the railroad sales department of this organization.

Patrick J. Carroll, president of the Bucyrus Steel Castings Company, the Ohio Locomotive Crane Company and the Carroll Foundry & Machine Company, Bucyrus, Ohio, died on January 20 at the age of 55 years.

H. K. Porter, southern sales agent with office at Atlanta, Ga., for the U. S. Metal & Manufacturing Company, of New York, has resigned, to accept a position with the Hyatt Roller Bearing Company, of Newark, N. J., effective February 7.

Frank Snyder, general superintendent of the Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., died at his home in that city on Wednesday, February 2, after an illness of about ten days. Mr. Snyder had been general superintendent of the company ever since its organization 26 years ago.

L. C. Ryan, roadmaster of the Chicago & North Western at Sterling, Ill., has been appointed sales manager for the Positive Rail Anchor Company, Incorporated, with headquarters at 747 Railway Exchange, Chicago, Ill. Mr. Ryan has been secretary of the Roadmasters' and Maintenance of Way Association for the past four years.

F. V. Roy, heretofore manager of the railway supplies department of Fairbanks, Morse & Co., Chicago, has been appointed manager of the company's Omaha house. E. E. Pendray, heretofore representing the company in Texas territory, has been appointed manager of the railway supplies department, with headquarters at St. Louis. C. N. Wilson, representative on the St. Louis lines, has been transferred to the Texas territory, with headquarters at Houston, Tex.

The General Roofing Manufacturing Company, St. Louis, Mo., announces the following changes in its organization: W. E. Rhine, sales manager of the Philadelphia office, has been appointed managing director of the company's business in Europe, with office at London, Eng. Mr. Rhine has been succeeded as sales manager at Philadelphia by H. P. Stewart, assistant sales manager there. Dutro C. Cale, former sales manager at the St. Louis office, has been made manager of the Pacific coast territory, with headquarters at San Francisco, Cal. Carl C. McCann has been appointed manager of the company's business in the Antipodes, with office at Sidney, Australia. George W. Watson, manager of the York (Pa.) mill, has been appointed assistant to the vice-president in New York City, and R. S. Crawford, formerly manager of the paint department at St. Louis, has been made assistant to the vice-president at St. Louis. W. R. McEuen, sales manager at Chicago, Ill., has been promoted to assistant to the vice-president at Chicago. H. A. Jackson, assistant sales manager at Chicago, has been appointed sales manager, vice Mr. McEuen.

The American Dump Car Company, Pioneer building, St. Paul, Minn., has been organized for the manufacture of automatic dump cars for both industrial and railroad purposes, frogs, switches and crossings, coal cars, lumber trucks, end dump cars, gable dump cars, brick yard cars and concrete cars. The company has been capitalized at \$500,000, and has elected the following officers: Louis A. Welsch, president; Merton A. Pocock, general sales manager; Harry C. Lightner, secretary and treasurer, and William L. Johnson, vice-president and general manager. Thirty acres of land have been acquired from the Northern Pacific at Gladstone, Minn., of which about two and one-half acres

are under cover. The shops are expected to be ready for work early in the spring. Mr. Welsch, the president, is a mechanical engineer and the inventor of the American automatic dump car, which breaks in the middle and dumps to both sides simultaneously, and can also be dumped to either side. Mr. Pocock is a manufacturer's agent with offices at St. Paul and Minneapolis. Mr. Lightner is an expert accountant, and Mr. Johnson has been a railroad contractor, having been connected with the Winston Brothers Company for a number of years, and more recently with the firm of Hoy & Johnson, of St. Paul. The company also plans to do locomotive, steam shovel and general car repairing.

Henry Lee, secretary and treasurer of the Simmons-Boardman Publishing Company, publishers of the *Railway Age Gazette*, has been elected a vice-president. Mr. Lee has spent his entire business career with the *Railway Age Gazette* and *The Railway Age*. He was born at Hamlet, Ill., on May 25, 1884, and was educated in the common schools at Hamlet, and the high school at Aledo, Ill. In 1905, he graduated from a business college in Chicago, and on June 6 of that year joined the staff of *The Railway Age* as assistant to the business manager. In December, 1906, he was assigned to the news staff, and in September of the following year became an associate editor and was transferred to New York. On the consolidation of the *Railroad Gazette* and *The Railway Age* as the *Railway Age Gazette* in June, 1908, he was transferred back to Chicago. In April, 1909, however, he returned to New York, was put in the business department and placed in charge of the advertising make-up desk. About November, 1909, he was given charge of writing advertising copy, and thus founded the copy-service department of the publication. He was shortly afterwards made one of the paper's representatives in the trade, and in March, 1910, was made secretary. In February, 1911, he was also elected treasurer, becoming in June, 1912, a director. Mr. Lee has also taken an active part in the publishers' organizations devoted to technical and trade papers. In 1911-12 he was secretary and treasurer of the Federation of Trade Press Associations of the United States, and in January of this year was elected secretary of the New York Trade Press Association. As vice-president of the Simmons-Boardman Publishing Company he will also continue as treasurer of the company.



Henry Lee

Cambria Steel Company Acquired by Midvale Interests

Announcement was made on Monday that the Midvale Steel & Ordnance Company had acquired a controlling interest in the Cambria Steel Company and had made an agreement with J. Leonard Replogle, W. H. Donner and E. T. Stotesbury to purchase the entire capital stock of the company at a cash price of \$81 a share.

This action puts an end to the negotiations leading to a possible merger of the Cambria Steel Company, the Lackawanna Steel Company and the Republic Sheet & Tube Company which have been under way since last November. The Cambria Steel Company is capitalized at \$50,000,000, of which \$45,000,000 is outstanding in shares of \$50 par value. At one time the Pennsylvania Company (Pennsylvania Lines West of Pittsburgh) owned \$22,504,000 or slightly over 51 per cent. It later sold 98,000 shares in the open market and William H. Donner, president of the Pennsylvania and the Cambria Steel Companies, exercised options on 112,000 shares. On November 12, J. Leonard Replogle, vice-president and general manager of sales of the American Vanadium Company and prior to March 1, 1915, vice-president and general manager of sales of the Cambria

Steel Company, acting for a syndicate, purchased 240,000 shares. Negotiations were begun soon after leading to a possible merger of the Cambria Steel Company, the Lackawanna Steel Company, and the Youngstown Sheet & Tube Company. In December a majority of the stockholders of the last named company voted to accept an offer of \$300 a share for their common and \$80 for their preferred stock. The rapid improvement in business conditions, however, handicapped the success of negotiations with the Lackawanna Company. It was not known until announcement was made that the Midvale interests had acquired control, that the latter were negotiating for the purchase of the Cambria Steel Company.

The acquisition of the Cambria Steel Company will further strengthen the already strong position of the Midvale Steel & Ordnance Company. The Cambria Steel Company is one of the most important independent steel mills. It manufactures rails, structural steel, bullets, wire, bars and various other finished steel products and has a finished steel capacity of about 1,200,000 tons annually. The company's plant is at Johnstown, Pa.; it also owns important ore deposits. To finance its purchase of the Cambria company the Midvale Steel & Ordnance Company will issue and sell to the Guaranty Trust Company and Lee, Higginson & Co. \$50,000,000 of its 25-year 5 per cent collateral trust sinking fund bonds, convertible into stock at any time at \$100 a share. It will also issue and offer to its shareholders its \$25,000,000 of treasury stock at \$60 a share.

Chicago Pneumatic Tool Company

The net earnings of the Chicago Pneumatic Tool Company for the fiscal year ending on June 30, 1915, were \$533,247, or 8.25 per cent on the capital stock of \$6,485,800. The surplus carried forward, after the payment of 4 per cent dividends and deducting \$162,519 profits of subsidiary companies retained by them for working capital, was \$2,278,132, as compared with \$2,165,356 on December 31, 1914. The statement follows:

Profits for the twelve months	\$982,863.86
Less—Depreciation of buildings, plant and machinery, including repairs and renewals to buildings and plant.....	\$270,466.70
Less—Written off for developing and perfecting new tools	11,374.92
	281,841.62
	\$701,022.24
Less—Bond interest for the year.....	\$117,775.00
Less—Sinking fund installment.....	50,000.00
	167,775.00
Balance carried to surplus.....	\$533,247.24
SURPLUS ACCOUNT	
Surplus as at December 31, 1914.....	\$2,165,356.96
Add—Net balance of profit and loss account.....	\$533,247.24
Less—Profits of subsidiary companies retained by them for working capital	162,519.36
	370,727.88
	\$2,536,084.84
Less—Dividends aggregating 4 per cent per annum.....	257,952.00
Surplus carried forward.....	\$2,278,132.84

In the report Pres. W. O. Duntley says in part: "Business conditions generally were most unfavorable until the latter part of the year, the depression being even greater during the early part of 1915 than it was in 1914. Competition in all our products was exceedingly keen for this reason, and on account of the increased cost of the materials and labor entering into the manufacture of our products most orders obtained were on a closer margin of profit than heretofore. By comparison with our former reports, it will be found that the net results for the year 1915 are about normal. All the plants of the company are being operated to their capacity. Substantial additions have been made thereto, and their physical conditions have been kept up to standard."

THE TRANS-CONTINENTAL RAILWAY OF AUSTRALIA.—The engineer-in-chief of the Commonwealth Government Railways has reported as to the Trans-continental Railway that in Western Australia the route has been surveyed and definitely located for 260 miles. In South Australia the survey is complete throughout, and the route has been definitely fixed for the 428 miles between the terminus of Port Augusta and Ooldea; 240 miles in Western Australia and 263½ miles in South Australia are ready for platelaying, out of which total of 503½ miles 495½ miles has been done. Very heavy construction work at the South Australia end is being approached, but it is hoped that the rails will be laid throughout by the end of the present year.

Railway Construction

ALABAMA CENTRAL.—This road has been extended from Manchester, Ala., to Sunlight, 6 miles.

ATLANTIC COAST LINE.—Surveys are now in progress for building an extension from the present southern terminus of the Haines City branch at Sebring, Fla., south via Hall City to Immokalee, 75 miles. The construction of this extension has not yet been authorized.

ATLANTIC & NORTHWESTERN.—Under this name a line is to be built from Brunswick, Ga., northwest via Lyons, Gillis Springs, Adrian and Wrightsville to Milledgeville, about 190 miles. Grading work between Lyons and Wrightsville, 48.5 miles, has been finished, except on a section of about 5 miles. The plans include putting up new station buildings and two bridges on the line. J. H. Rowland, Wrightsville, is interested.

CHESAPEAKE & OHIO.—A contract has been given to Board & Duffield, Charleston, W. Va., to build the Pond Fork Railway. The projected route is from a connection with Coal River district of the Chesapeake & Ohio at Madison in Boone county, W. Va., southeast up Pond Fork to the mouth of Left Fork of Pond Fork, about 10 miles. The work involves handling about 21,000 cu. yd. to the mile. The maximum grade will be 0.5 per cent, and the maximum curvature 12 degrees. There will be three small bridges on the line; the work calls for the construction of about 3,000 cu. yd. of concrete for bridges and culverts. The line is being built to carry coal and timber. (October 1, p. 622.)

PHILADELPHIA ROADS.—Contracts for building the Frankford Elevated Line, from Unity street to Dyre street, Philadelphia, Pa., have been let as follows: To Edwin H. Vare, Philadelphia, for the foundation work, at \$23,870, and to the American Bridge Company, Philadelphia, for the steel superstructure and appurtenant work at \$257,475. Awards of these contracts have been delayed awaiting the approval of plans by the Public Service Commission of Pennsylvania. (December 24, p. 1218.)

POND FORK RAILWAY.—See Chesapeake & Ohio.

RAILWAY STRUCTURES

NEW LONDON, CONN.—The New York, New Haven & Hartford will receive bids on February 23, for the new bridge to be built over the Thames river between Groton and New London. The total estimated cost of the bridge is \$2,000,000. (October 22, p. 780.)

NEWPORT NEWS, VA.—The Chesapeake & Ohio will build a new office building on River Road in Newport News. The proposed structure is to be three stories high, 53 ft. by 127 ft. of brick construction, and is to cost about \$60,000.

PORTLAND, ORE.—The city has awarded a contract for the construction of a reinforced concrete viaduct over the tracks of the Oregon-Washington Railroad & Navigation Company to Giebisch & Joplin, of this city. The structure will be 220 ft. long by 58 ft. wide, and will cost \$34,000. The contract for the approaches was let to the Pacific Bridge Company, Portland, at \$14,000.

READING, PA.—The Pennsylvania Railroad is planning to renew the double track through truss bridge over the Schuylkill river below Reading. This is to be accomplished by building intermediate piers and using a half through girder structure with a solid concrete floor. Plans are also being made for replacing the deck truss structures at Poplar Neck and at Angelica with concrete arch bridges. This work is a part of the improvements being carried out by the company of replacing light bridges with heavier structures.

SUNBURY, PA.—The Philadelphia & Reading has let contracts for rebuilding the Sunbury bridge as follows: To Seeds & Derham, Philadelphia, for the substructure, and to the American Bridge Company, Philadelphia, for the superstructure.

Railway Financial News

CHICAGO, ROCK ISLAND & PACIFIC.—The \$7,500,000 2-year 6 per cent notes due February 16 have been extended for six months, with the same collateral, and it is said have been assumed as an obligation of the receiver.

ERIE.—The New York Public Service Commission, Second district, has approved the issue of \$4,275,000 4½ per cent equipment trust certificates of the Erie to be sold at 97½. The equipment consists of 2,000 freight cars, 19 passenger-train cars and 68 locomotives costing a total of \$5,000,000, of which the Erie pays \$805,000 cash.

EVANSVILLE & INDIANAPOLIS.—William P. Kappes has been appointed receiver of this company, which up to now has been operated by the receiver of the Chicago & Eastern Illinois.

LONG ISLAND.—The New York Public Service Commission, Second district, has approved the issue of \$13,000,000 4 per cent one-year debenture bonds of the Long Island at par. The first application for these debentures was made in 1909. The debentures will be issued at part to the Pennsylvania Railroad to reimburse that company for expenditures for additions and betterments made on the Long Island. See editorial comments elsewhere in this issue.

NEW YORK, NEW HAVEN & HARTFORD.—The following is the substance of the statement given out by President Elliott in regard to the refunding of the \$27,000,000 one-year 5 per cent notes due May 1:

There was a meeting of the special finance committee of the board of directors on February 1 to consider the payment of \$27,000,000 of 5 per cent notes, due May 1, 1916.

During the winter of 1915 certain changes were made in the laws of Connecticut, Massachusetts and Rhode Island, under which the company now has the legal right to obtain new capital by creating a mortgage and issuing bonds thereunder and by issuing preferred stock, conditional upon the approval of the stockholders and public service commissions of those three states. The legislature of Massachusetts ordered at the same time the public service commission of that state to make an investigation into and report upon the financial affairs of the New Haven Road, and it is expected that this report will be made public in the latter part of February. Pending the receipt of this report and action thereon it seems to the committee unwise to attempt to make a mortgage and to issue bonds thereunder to take up the notes due May 1.

The committee also considered the advisability of recommending an increase in the capital of the company by an issue of preferred stock. The committee concluded, however, that it is not best to ask the stockholders for action on any such plan prior to May 1, although they feel that the stockholders should give to this method of raising money their careful consideration, so that debts may be paid and needed improvements made promptly. No amount of new stock has ever been determined upon and the report that \$75,000,000 or any other amount was to be recommended is without foundation.

The committee decided that, for the present, the amount of the indebtedness maturing May 1 should be reduced as much as practicable from the resources of the company and that the remainder should be renewed upon the best terms obtainable.

The changes in the debt of the company during the last three fiscal years have been as follows:

Year ending June 30, 1914.....	Increase	\$3,364,250
Year ending June 30, 1915.....	Decrease	3,689,000
Seven months ending February 1, 1916.....	Decrease	2,940,000
Total decrease since July 1, 1913.....		\$3,264,750

Capital expenditures for additions and betterments and equipment for the same periods were:

Year ending June 30, 1914.....	\$4,915,788
Year ending June 30, 1915.....	2,351,970
Six months ending December 31, 1915.....	1,524,209
Total	\$8,791,967

ANNUAL REPORT

NORTHERN PACIFIC RAILWAY COMPANY—NINETEENTH ANNUAL REPORT

OFFICE OF THE
NORTHERN PACIFIC RAILWAY COMPANY,
34 NASSAU STREET, NEW YORK.

September 15, 1915.

To the Stockholders of the Northern Pacific Railway Company:

The following, being the Nineteenth Annual Report shows the result of the operation of your property for the fiscal year ending June 30, 1915:

INCOME ACCOUNT

I—OPERATING INCOME. (SEE NOTE BELOW.)

Railway operating revenues. (Transportation and incidents thereof, other than those mentioned below).....	\$63,171,652.60
Railway operating expenses.....	37,108,048.88
Net revenue.....	\$26,063,603.72
Railway tax accruals.....	\$4,470,958.70
Uncollectible railway revenues.....	4,151.33
Total operating income.....	\$4,475,110.03
Total operating income.....	\$21,588,493.69

II—NON-OPERATING INCOME. (SEE NOTE BELOW.)

Hire of freight cars—credit balance.....	\$512,197.20
Rent from locomotives and cars.....	421,787.31
Joint facility rent income.....	1,839,275.32
Income from lease of road.....	273,352.51
Miscellaneous rent income.....	330,970.61
Miscellaneous non-operating physical property—rents.....	35,748.88
Separately operated properties—profit.....	39,194.81
Dividend income.....	*6,203,932.00
Income from funded securities.....	235,004.75
Income from unfunded securities and accounts.....	440,713.01
Income from sinking and other reserve funds.....	108,245.99
Miscellaneous income.....	2,536.94
Total non-operating income.....	\$10,442,959.33
Gross income.....	\$32,031,453.02

III—DEDUCTIONS FROM GROSS INCOME. (SEE NOTE BELOW.)

Rent for locomotives and cars.....	\$118,532.38
Joint facility rents.....	493,150.80
Rent for lease of roads.....	51,331.86
Miscellaneous rents.....	5,752.89
Interest on funded debt.....	†12,294,400.16
Interest on unfunded debt.....	54,380.43
Miscellaneous income charges.....	191,084.17
Total deductions from gross income.....	\$13,208,632.69
Net income.....	\$18,822,820.33

IV—DISPOSITION OF NET INCOME.

Dividend appropriation of income.....	\$17,360,000.00
Income balance for year—transferred to profit and loss.....	\$1,462,820.33

NOTE:—Radical changes have been made in the Classifications of the Interstate Commerce Commission as of July 1, 1914. The form of Income Account here used is that prescribed by the Commission. The Company does not, however, admit the correctness of the groupings of some of the items of income.

*Includes dividends on stock of Chicago, Burlington & Quincy R. R. owned by this Company.

†Includes interest paid on this Company's proportion of joint bonds issued by this Company and the Great Northern Railway Company, secured by C., B. & Q. R. R. capital stock as collateral.

MILEAGE OPERATED.

Changes have taken place in the mileage operated during the year as follows:

There were added:

	Miles
July 1, 1914. North Yakima & Valley Lines in Washington, acquired.....	39.32
July 1, 1914. Port Townsend Southern Railroad—Southern Division in Washington, acquired.....	15.00
July 1, 1914. Oregon-Washington R. R. & Navigation Co. in Washington, leased.....	.13
Aug. 23, 1914. Simcoe Branch, Washington, acquired.....	9.90
Aug. 23, 1914. Cowiche Branch, Washington, acquired.....	3.74
Nov. 23, 1914. Spring Creek Branch in North Dakota, extended.....	33.85
Dec. 12, 1914. Edgecomb-Kruse Branch in Washington, constructed.....	3.80
Dec. 15, 1914. Point Defiance Line in Washington, constructed.....	42.95
Dec. 1, 1914. Seattle Southeastern Railway in Washington, leased.....	.27
Feb. 19, 1915. Main Line in Washington (second track constructed).....	3.44
May 1, 1915. Connection with "Soo" Line in Minnesota, constructed.....	.80
May 1, 1915. Cuyuna Northern Branch in Minnesota, constructed.....	.09
May 1, 1915. Minneapolis, St. Paul & Sault Ste. Marie Ry. in Minnesota, leased.....	.74
June 1, 1915. Connection with Great Northern Railway in Washington, constructed.....	.59
June 30, 1915. Sundry petty changes and corrections.....	14.97
Total additions.....	169.59

Deductions:

Dec. 15, 1914. Tacoma-Tenino Line in Washington, track taken up.....	61
Dec. 15, 1914. Olympia Branch in Washington, track taken up.....	3.55
Dec. 15, 1914. Port Townsend Southern R. R. (Tumwater Branch) track taken up.....	5.00

Feb. 19, 1915. Main Line in Washington, track taken up.....	5.74
June 1, 1915. Monte Cristo Branch in Washington, leased.....	42.12
Total deductions.....	57.02
Net additions.....	112.57
Mileage operated June 30th, 1914.....	6,353.60
Mileage operated June 30th, 1915.....	6,466.17
Average mileage operated during year.....	6,460.67

REVENUE TRAIN MILEAGE.

Revenue passenger train miles during the year were 10,356,705, a decrease of 1,658,433 miles compared with previous year.
Revenue freight and mixed train miles during the year were 9,012,235, a decrease of 917,576 miles.
Revenue special train miles during the year were 18,622, an increase of 2,335 miles.
All revenue train miles during the year were 19,387,562, a decrease of 2,573,674 train miles.

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was \$43,833,636.90, a decrease of \$4,322,195.89, or 8.98 per cent compared with the previous year.
5,164,571,432 tons of revenue freight were moved one mile, a decrease of 464,779,995 tons one mile or 8.26 per cent less than the previous year.
The average earnings per ton mile decreased from .00855 to .00849.
The revenue train load increased from 566.91 to 573.06 tons. The total train load, including company freight, increased from 665.76 to 668.45 tons.
The number of miles run by revenue freight trains was 8,107,560, a decrease of 1,081,812, or 11.77 per cent.

PASSENGER BUSINESS.

Passenger revenue was \$13,619,113.80, a decrease of \$2,087,886.60 or 13.29 per cent compared with the previous year.
Mail revenue was \$1,116,525.39, an increase of \$72,804.93 or 6.98 per cent.
Express revenue was \$1,225,192.88, a decrease of \$86,984.34 or 6.63 per cent.
Sleeping car, parlor and chair car, excess baggage and miscellaneous passenger revenue was \$803,480.28, a decrease of \$236,009.92 or 22.70 per cent.
Total revenue for persons and property carried on passenger trains was \$16,764,312.35, a decrease of \$2,338,075.93 or 12.24 per cent compared with the previous year.
The number of passengers carried was 8,756,784, a decrease of 1,103,439 from the previous year, and the number of passengers carried one mile was 600,273,153, a decrease of 81,998,277 or 12.02 per cent.
The number of miles run by revenue passenger trains was 10,356,705, a decrease of 1,658,433 or 13.80 per cent.
The average earnings per passenger per mile was .02269 and .02302 last year.

EARNINGS AND EXPENSES PER MILE.

Operating revenues per mile (average).....	\$9,777.88
Operating expenses per mile (average).....	5,743.68
Net operating revenue per mile (average).....	4,034.20
Taxes per mile (average).....	692.03

RATIOS.

Operating expenses to operating revenue.....	58.74%
Taxes to operating revenue.....	7.08%

OPERATING EXPENSES.

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were \$18,987,055.76, a decrease of \$2,780,145.56 or 12.77 per cent, as against a decrease of total operating revenue of 10.33 per cent.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were \$7,317,074.42, a decrease of \$1,121,201.24 or 13.29 per cent.

LOCOMOTIVES.

Total number locomotives on active list June 30, 1914.....	1,357
Additions:	
Engines acquired with roads purchased.....	5
	1,362
Deductions:	
Engine sold during the year, from active list.....	1
Total locomotives on active list June 30, 1915.....	1,361
In addition to the engines on active list there were:	
Withdrawn from service and on hand from previous year..	123
Dismantled during year.....	1
Leaving on hand engines withdrawn from service which may be sold.....	122

HAULING CAPACITY.

Active List.	Number.	Tractive Power. (Pounds.)	Total Weight on Drivers. (Pounds.)	Total Weight of Engines. (Pounds.)
Assignment June 30, 1914....	1,357	45,396,940	204,028,473	259,408,108
Added during fiscal year, engines acquired.....	5	71,700	316,115	454,560
Added during fiscal year*....	.....	44,000	65,100	111,500
Total.....	1,362	45,424,640	204,409,688	259,974,168
Engine sold and permanently retired.....	1	28,200	126,000	126,000
Total.....	1,361	45,396,440	204,283,688	259,848,168

*Account compound engines changed to simple, engines having superheaters applied, and engines having cylinders bushed and steam pressure changed.

The following statement shows the character and condition of the locomotives of the Company on June 30, 1915:

Wheel Arrangement.	Owned June 30, 1914.	Sold or Permanently Withdrawn from Service.	Added.	Owned June 30, 1915.	Average Weight of Locomotive without tender. (Tons of 2,000 lbs.)		Average Tractive Force—Lbs.
					Total.	On Drivers.	
000	1			1	28.50	28.50	8,500
000	1			1	30.25	17.00	7,900
000	170	1		169	66.97	66.97	28,308
0000	14			14	66.71	66.71	26,264
0000	103			106	34.37	45.15	18,373
0000	118			118	88.02	78.72	37,666
00000	2			2	72.51	65.27	34,800
00000	60		3	63	46.43	29.66	14,281
00000	277		1	278	80.23	60.21	26,426
000000	4			4	93.00	75.00	38,500
000000	6			6	94.59	43.85	21,483
000000	142			142	113.37	71.37	31,095
000000	150			150	102.25	76.75	33,500
000000	270			270	135.75	105.54	48,411
0000000	22			22	170.70	150.72	64,936
00000000	15			15	225.80	200.73	89,500
Total	1,357	1	5	1,361	95.46	75.05	33,355

Changes in weight and tractive power noted above are due to engines being simplified, engines having superheaters applied, and engines having cylinders bushed and steam pressure changed.

Condition.	Number.	Per Cent.
Good	1,095	80.46
Fair	158	11.60
At Shops	108	7.94
	1,361	100.00
Number of oil burning locomotives.	56	4.11
Number of locomotives equipped with superheaters.	261	19.18

PASSENGER EQUIPMENT.

On June 30, 1915, the company owned 1,287 passenger train cars, including 129 sleeping cars owned jointly with the Pullman Company, an increase of 127 cars. The number and kind of cars owned is shown in table on page 40.

Of the 1,287 cars owned 969 were not due in shops for two months or more.

FREIGHT EQUIPMENT.

Comparative number and capacity of freight cars:

	1914.		1915.		Increase or Decrease.	
	Number.	Capacity (Tons of 2,000 lbs.)	Number.	Capacity (Tons of 2,000 lbs.)	Number.	Capacity (Tons of 2,000 lbs.)
Box	26,358	994,930	25,936	983,150	422	11,780
Furniture and Automobile.	747	26,850	672	24,895	75	1,955
Refrigerator	4,080	130,320	4,052	129,855	28	465
Stock	2,702	65,285	2,473	57,435	229	7,850
Flat	8,654	305,195	8,507	301,085	147	4,110
Oil	62	2,555	62	2,555		
Coal	5,336	255,990	5,206	252,065	130	3,925
Ballast and Ore.	1,035	43,105	1,252	54,290	217	11,185
Total	48,974	1,824,230	48,160	1,805,330	814	18,900
Percentage					1.66%	1.04%
Average capacity per car.		37.3		37.5		

NOTE—Figures in italics denote increase.

Of the total number of freight cars on June 30, 1915, 2,119 or 4.40% were in need of repairs costing \$5.00 or more per car.

No additional passenger or freight equipment is under contract for construction or is building at the Company's Shops.

MAINTENANCE OF WAY AND STRUCTURES.

The charges for Maintenance of Way and Structures were \$8,523,657.45, a decrease of \$840,166.46, or 8.97 per cent.

The table in the Report of the Comptroller (page 28) shows the distribution of this decrease under the respective accounts.

The following statements give particulars of some of the work done and show that the property has been well maintained.

PERMANENT WAY.		1914	1915
New main line laid with 90-pound rail.	miles	.....	46.39
New second track laid with 90-pound rail.	"	.....	61.56
New second track laid with 85-pound rail.	"	2.31	.....
New branch lines laid with 90-pound rail.	"	.....	3.82
New branch lines laid with 85-pound rail.	"	38.41	36.87
New branch lines laid with 72-pound rail.	"	6.58	.....
New branch lines laid with 56, 60 or 70-pound rail.	"	1.21	1.33
Main line relaid with 90-pound rail.	"	147.05	119.88
Main line relaid with 85-pound rail.	"	34.16	9.01
Second track relaid with 90-pound rail.	"	7.75	22.85
Second track relaid with 85-pound rail.	"	2.46	.....
Branch lines relaid with 90-pound rail.	"	3.21	1.39
Branch lines relaid with 56, 66, 72 or 85-pound rail.	"	166.09	79.31
Sidings and spurs constructed.	"	112.58	33.69
Track ballasted.	"	379.32	382.97
Embankment widened.	"	194.92	64.73
Cross tie renewals, main line.	ties	2,140,758	1,956,832
Cross tie renewals, branch lines.	"	990,700	1,060,667
Timber bridges replaced by permanent structures and embankments.	miles	67	57
Equal to	"	3.38	1.36
Timber bridges renewed.	"	89	64

Timber culverts replaced.	1914	1915
New stock fence constructed.	172	176
New snow fence constructed.	143.97	126.44
	3.15	3.65

RAIL IN MAIN, SECOND AND THIRD TRACKS

	Main Line		Second & Third		Total Miles	
	Miles	Branches Miles	Track Miles		1915	1914
100-pound steel	47.40	.....	.....	47.40	47.40	47.23
90-pound steel	1,695.88	75.51	321.33	2,092.72	2,092.72	1,836.83
85-pound steel	979.47	245.77	339.22	1,564.46	1,564.46	1,557.81
80-pound steel	1.12	.....	1.10	2.22	2.22	2.26
76-pound steel	.....	5.14	.....	5.14	5.14	5.14
72-pound steel	80.79	1,179.78	12.93	1,273.50	1,272.82	1,272.82
70-pound steel	.....	43.86	.....	43.86	43.86	43.86
66 and 67-pound steel	61.70	483.84	5.11	550.65	536.73	536.73
60-pound steel	2.60	81.00	.....	83.60	176.05	176.05
56-pound steel	2.59	1,256.00	.81	1,259.40	1,277.94	1,277.94
Other weights	.....	15.71	.....	15.71	11.00	11.00
Total	2,871.55	3,386.61	680.50	6,938.66	6,767.67	6,767.67

BRIDGES

During the year 128 bridges were replaced, 64 of which, 10,373 feet in length, were replaced by timber structures, and 7 permanent and 57 timber structures in permanent form as follows:

By embankment, 44 bridges, 4,436 lineal feet; by steel truss, girder, I-beam and reinforced concrete trestle, 20 bridges, 3,916 lineal feet; total, 64 bridges, 8,352 lineal feet.

In addition to changes referred to above, 5 permanent and 113 temporary bridges were abandoned by line changes, and 18 permanent and 270 temporary structures were added on old and new lines; 176 timber culverts were rebuilt, 12 in temporary and 164 in permanent form.

There are now under construction on operated lines 1,200 lineal feet of steel girder and I-beam spans for single track; one 218-foot single-track drawbridge, 394 lineal feet of double track, 126 lineal feet of four-track and 54 lineal feet of 15-track solid floor steel construction of deck type; 50 lineal feet of double track, 87 lineal feet of four track, 853 lineal feet of six track and 21 lineal feet of 15 track and one 68-foot reinforced concrete arch carrying 9 tracks.

BRIDGES AS THEY EXISTED JUNE 30, 1915

Description	No.	Aggregate Length—Lineal Feet	Miles
Steel, iron, stone and concrete permanent bridges	654	120,324	22.8
Timber and combination iron and timber structures	2,613	420,921	79.7
Total	3,267	541,245	102.5

Total length of timber structures replaced by steel bridges, embankment or other permanent form, from July 1, 1885, when work was commenced, to June 30, 1915, has been 132.07 miles.

BUILDINGS AT STATIONS

New buildings and structures, or increased facilities have been provided at the following stations:

Minnesota.—Center City, Sartell, Aldrich and Wadena.
North Dakota.—LaMoure, Belfield and Medora.
Montana.—Sidney, Billings, Whitehall, Boyd and Philipsburg.
Idaho.—Coeur d'Alene.
Washington.—Walla Walla, Cle Elum, South Prairie, Prairie, Rochester and Malone.

SHOPS, ENGINE FACILITIES AND YARDS

Buildings, tracks, turntables, or increased engine facilities have been provided at the following points:

Minnesota.—Brainerd, Saint Paul and Staples.
North Dakota.—Dickinson.
Montana.—Glendive, Forsyth, Billings, Townsend, Whitehall, Montana Union Transfer, Helena and Missoula.
Idaho.—Wallace.
Washington.—Ellensburg, Tacoma, South Tacoma, Hoquiam and Centralia.

FUEL STATIONS

Additional or increased facilities have been provided at the following points:

Minnesota.—Saint Paul.
North Dakota.—Pembina.
Montana.—Laurel.
Washington.—Ellensburg and Easton.

WATER SUPPLY

Additional or increased facilities have been provided at the following points:

Minnesota.—Saint Paul.
Montana.—Terry, Forsyth and Whitehall.
Idaho.—Lewiston.
Washington.—Parkwater, Lester and Tacoma.

BLOCK SIGNALS.

Block signals have been installed and placed in service at the following points:

Minnesota.—Brainerd depot.
Montana.—Livingston-Toston.
Idaho.—Paradise-Sand Point and Athol-Hauser.
Washington.—Pasco-Alfalfa and Cle Elum-Easton.

On June 30, 1915, on 2,485 miles of important main line, there were 1,184.30 miles protected by automatic block signals, and 337.50 miles protected by manual block.

INTERLOCKING PLANTS

Interlocking plants have been installed and placed in service at McGregor, Minnesota, and at Ballard and Steilacoom, Washington.

DOCKS AND WHARVES

West Seattle, Washington, covered shed on dock, and fire walls.
Tacoma, Washington, brick fire wall between wheat warehouse and municipal dock.

Extensive repairs, including new foundation made to gravity coal bunker No. 4, and two pockets were remodeled to permit the handling of coke for shipment on barges.

CHARGES TO CAPITAL ACCOUNT

Upon requisition of the Executive Officers, approved by the Board of Directors, expenditures for additions to and betterments of the property have been made during the past fiscal year for:

Real Estate, Right of Way and Terminals:	
Superior, Wis., real estate.....	\$8,224.49
St. Paul, Minn., real estate.....	21,879.33
Minneapolis, Minn., real estate.....	42,746.41
Tacoma, Wash., real estate.....	2,866.40
Aberdeen, Wash., real estate.....(Cr.)	10.00
	\$75,706.63

Branches, Line Changes, Grade Revision and Second Main Track:

Superior, Wis., right of way and track to ore dock.....	\$201.95
Cuyuna Northern Branch, Minn. (extension)...	57,335.57
Duluth Transfer Railway, Minn., reconstruction.	24,923.55
Minneapolis, Minn., grade separation and change of line.....	1,263.78
Rice's to Little Falls, Minn. (second main tracks).....	12,753.81
Golden Valley Branch, N. Dak. and Mont. (construction).....	134,729.96
Spring Creek Line, N. Dak. (construction)....	592,849.15
Western Dakota Branch and Extension, N. Dak.	23,318.24
Bitter Root Branch, Montana (extension)....	1,513.00
Camp Creek Branch, Montana (construction)...	2,390.12
Elkhorn Branch, Montana (removal of line in prior years).....(Cr.)	239,389.56
Huntley to Billings, Mont. (second main track)	4,740.38
Edgcomb to Kruse, Wash. (construction)....	55,313.12
Freemont-Ballard Line and Drawbridge, Washington (construction).....	34,062.59
Gray's Harbor & Columbia River Railway, Washington (right of way).....	1,320.84
Lester to Easton, Wash. (grade revision and double track).....	664,744.91
M. P. 73 to Yardley (Spokane), Wash. (second main track).....	3,610.46
North Yakima & Valley Branches and Extensions, Washington.....	13,626.29
Spokane, Wash. (grade separation).....	453,605.26
Point Defiance Line, Tacoma to Tenino (construction).....	2,287,181.77
Port Townsend Southern Branch, removal of line between Tenino and Plumb.....(Cr.)	63,890.29
Tenino to Vancouver, Wash. (grade revision and double track).....	13,086.47
Sundry expenditures and adjustments.....	983.52
	4,080,874.89

Additions and Betterments:

Right of way and station grounds.....	\$158,786.82
Widening cuts and fills.....	159,643.00
Protection of banks and drainage.....	139,545.44
Grade reductions and changes of line.....	312,974.82
Tunnel improvements.....	91,083.01
Bridges, trestles and culverts.....	354,087.33
Increased weight of rail.....	296,380.29
Improved frogs and switches.....	24,160.98
Track fastenings and appurtenances.....	504,720.47
Ballast.....	266,611.51
Additional main tracks.....	1,579.10
Sidings and spur tracks.....	311,704.35
Terminal yards.....	332,639.63
Fencing right of way.....	27,145.73
Improvement of crossings, under and over grade	37,097.68
Elimination of grade crossings.....	42,223.82
Interlocking apparatus.....	4,349.10
Block and other signal apparatus.....	357,920.31
Telegraph and telephone lines.....	57,946.76
Station buildings and fixtures.....	982,148.11
Shops, engine-houses and turntables.....	349,668.66
Shop machinery and tools.....	32,917.50
Water and fuel stations.....(Cr.)	37,682.00
Dock and wharf property.....	9,003.37
Snow and sand fences and snow sheds.....	1,892.24
Other additions and betterments.....(Cr.)	14,725.02
Assessments for public improvements.....	175,722.51
Paving.....	1,337.63
Roadway machinery and tools.....	241.31
	4,981,124.46

New Equipment:

	Total Expenditure	Less used from Reserves	Charged Capital
Locomotives.....	\$82,557.22	\$7,394.00	\$75,163.22
Passenger train cars...	1,307,913.46	74,707.59	1,233,205.87
Freight train and work cars.....	478,963.74	296,844.46	182,119.28
	\$1,869,434.42	378,946.05	1,490,488.37
Total.....			\$10,628,194.35

Less:

Adjustments of original value of lines abandoned in previous years in connection with line changes.....	1,650,690.20
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Net additions and betterments for the year..... \$8,977,504.15

In addition to the foregoing, added to the cost of the Northern Pacific Estate, advances have been made during the year to sundry companies, as follows:

Midland Railway Company of Manitoba.....	\$87,422.44
Olympic Peninsula Railway Company.....	16.00
Kennewick Northern Railway Company.(Cr.)	3.10
Bear Creek and Western Railway Company..	693.67
Missoula & Hamilton Railway Company.....	513.68
Northern Pacific Terminal Company.....	42,694.80
	\$131,337.49

RESERVE FOR ACCRUED DEPRECIATION OF EQUIPMENT

Credit balance, reserve for accrued depreciation July 1, 1914. \$13,491,811.76
Credits during the year ending June 30th, 1915:

From charges to Operating Expenses:

Maintenance of equipment depreciation....	\$709,569.36
Locomotives.....	\$207,532.11
Freight cars.....	398,073.40
Passenger cars.....	90,123.02
Floating equipment.....	1,063.32
Work equipment.....	12,777.51
Maintenance of equipment, retirements....	39,411.01
From salvage.....	218,613.39
From equipment sold.....	33,206.64
	1,000,800.40
	\$14,492,612.16

Less equipment retired:

Locomotives.....	\$7,394.00
Passenger cars.....	74,707.59
Freight cars.....	259,647.55
Miscellaneous equipment.....	37,196.91
	378,946.05

Credit balance June 30, 1915..... \$14,113,666.11

CAPITAL STOCK AND DEBT.

There has been no change in the amount of capital stock outstanding during the year, viz.:.....\$248,000,000.00

Changes in bonded debt were as follows:

Refunding and Improvement bonds issued under Article four, Section 2 of mortgage..... 20,000,000.00

Prior Lien bonds issued in this calendar year under Article one, Section 4 of mortgage.. \$1,500,000.00

Deduct Prior Lien bonds purchased and cancelled under Article eight, Section 2 of mortgage..... 537,000.00

Deduct:..... \$963,000.00

St. Paul & Northern Pacific Railway Company mortgage bonds purchased by trustee and cancelled..... 72,000.00

891,000.00

Net increase in mortgage debt..... \$20,891,000.00

NEW LINES, GRADE REVISIONS, LINE CHANGES, ETC.

MINNESOTA.

Duluth:

Duluth Transfer Railway. This improvement, consisting of rebuilding the Duluth Transfer Railway Track from 59th Avenue West to the Minnesota Steel Plant at Spirit Lake, in progress at the date of the last annual report, has been completed. The actual length of line is 2.63 miles.

Cuyuna Northern:

The connection with the Minneapolis, St. Paul & Sault Ste. Marie Ry. at Cedar Lake under construction at the date of the last report has been completed. The length of the spur is 4,246 feet.

A spur track, 4,037 feet long to serve the Merrimac Mining Company has been constructed near Iron-ton.

St. Paul:

Work on the new General Office Building has been continued and it is expected that the building will be completed and occupied before the close of the year.

NORTH DAKOTA.

Spring Creek Line:

Track was laid from Golden Valley to Killdeer, a distance of 33.85 miles, and line turned over to the Operating Department November 23, 1914.

Golden Valley Branch:

Grading for a line southerly from Beach into the Golden Valley, 25.88 miles from connection with the main line was completed last fall. Track is being laid this season and the line will be completed in September.

WASHINGTON.

Spokane:

The separation of grades in the City of Spokane, which was commenced in January, 1913, but discontinued in April, 1913, owing to injunction suits, was resumed in October, 1914.

Lester to Easton:

The second track and line changes in progress for the past two years have been completed and turned over to the Operating Department February 20, 1915.

Point Defiance Line:

This line was completed and turned over to the Operating Department December 15, 1914.

Hoquiam:

To serve manufacturing sites on the east side of the Hoquiam River, a draw bridge and a track approximately 3,000 feet long have been constructed. The Oregon-Washington Railroad & Navigation, and the Chicago, Milwaukee & St. Paul Railway Companies are joint owners of these facilities, with the Northern Pacific Railway Company.

GENERAL.

CHANGES IN ACCOUNTING FORMS PRESCRIBED BY INTER-STATE COMMERCE COMMISSION.

Readers of this report will observe that the Income Account for the business year 1915, appearing on page 5, differs much in form from that heretofore used in these reports; also, that comparison with figures for the next prior year have been omitted.

The form herein used is that at present prescribed by the Commission. While the correctness of totals, and of resulting surpluses, appearing in this form is admitted, that of some of the groupings of revenues from the several sources, is not.

Radical differences in the two forms of Income Account have made impracticable the usual comparisons between figures for the year covered by this Report, and those for the year 1914. Consequently, no attempt at such a comparison has been made herein. Should present regulations continue in force, comparison can be resumed another year.

NOTE.—This Balance Sheet has been made in accordance with the Revised Form prescribed by the Interstate Commerce Commission as of July 1, 1914.

PASSENGER AND FREIGHT STATISTICS.

	1913-1914.		1914-1915.		Increase.	Per Cent.	Decrease.
	Miles, Tons, etc.	Amount, Rate, etc.	Miles, Tons, etc.	Amount, Rate, etc.			
Average mileage for year.....	6,325.26	.....	6,460.67	.....	135.41	.....	.....
PASSENGER TRAFFIC.							
Number of passengers carried.....	9,860,223	.....	8,756,784	.....	.....	11.19	1,103,439
Number of passengers carried one mile.....	682,271,430	.....	600,273,153	.....	.....	12.02	81,998,277
Average miles traveled by each passenger.....	69.2	.....	68.6	.....	.....	.87	.6
Passenger revenue.....	\$15,707,000.40	.....	\$13,619,113.80	.....	.....	13.29	\$2,087,886.60
Other passenger train revenue.....	3,395,387.88	.....	3,145,198.55	.....	.....	7.37	250,189.33
Total passenger train revenue.....	19,102,388.28	.....	16,764,312.35	.....	.....	12.24	2,338,075.93
Average amount paid by each passenger.....	1.59	.....	1.56	.....	.....	1.89	.03
Average rate per passenger per mile.....	.02302	.....	.02269	.....	.....	1.43	.00033
Passenger train revenue per mile of road (average mileage).....	\$3.020.02	.....	\$2,594.83	.....	.....	14.08	\$425.19
FREIGHT TRAFFIC.							
Number of tons revenue freight carried.....	20,422,419	.....	17,625,225	.....	.....	13.70	2,797,194
Number of tons revenue freight carried one mile.....	5,629,351,427	.....	5,164,571,432	.....	.....	8.26	464,779,995
Average distance haul of one ton.....	275.7	.....	293.0	.....	.....	6.27	.....
Freight revenue.....	\$48,155,832.79	.....	\$43,833,636.90	.....	.....	8.98	\$4,322,195.89
Other freight train revenue.....	817,250.01	.....	784,147.78	.....	.....	4.05	33,102.23
Total freight train revenue.....	48,973,082.80	.....	44,617,784.68	.....	.....	8.89	4,355,298.12
Average receipts from each ton of freight.....	2.36	.....	2.49	.....	.13	5.51	.....
Average receipts per ton per mile revenue freight.....	.00855	.....	.00849	.....	.....	.70	.00006
Freight train revenue per mile of road (average mileage).....	\$7,742.46	.....	\$6,906.06	.....	.....	10.80	\$836.40
TOTAL TRAIN TRAFFIC.							
Revenue from freight and passenger trains.....	\$68,075,471.08	.....	\$61,382,097.03	.....	.....	9.83	\$6,693,374.05
Revenue per mile of road (average mileage).....	10,762.48	.....	9,500.89	.....	.....	11.72	1,261.59
Revenue per train mile.....	3.10	.....	3.17	.....	.07	2.26	.....
Expenses per train mile.....	1.96	.....	1.92	.....	.....	2.04	.04
Net traffic revenue per train mile.....	1.14	.....	1.25	.....	.11	9.65	.....